SEQUENCE LISTING

<110> Universiteit Gent

<120> Fortification of plants with folates by metabolic engineering

<130> DVDS-001-PCT

<150> EP 07110852.6
<151> 2007-06-22

<160> 73

<170> PatentIn version 3.3

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<212> DNA
<213> Arabidopsis thaliana

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cgtgtcgcca aggcccttcg tgaagggacc agaggttata agcaaaaggt gaaggactat 240

gtacagagtg ctctgtttcc agaagcaggg ttggatgaag gagttgggca agcaggagga 300

gtcggaggac ttgttgttgt cagagacctc gatcattact cttactgtga atcttgcttg 360

cttccttttc atgtcaagtg tcacataggt tatgtcccat cgggccagag agtgttagga 420

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gttcttgaat gctctcacat tcacttcccc agtttggact tggactctct gaacttgtct 600

agccaccgtg gatttgtgaa gctactggtt tcctcggggt caggagtttt cgaggatgaa 660

agctcgaatc tttggggtga atttcagagt ttcttgatgt tcaaaggtgt aaaaacgcaa 720

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atgttgaact tccaaagaac caacctcgaa atgaagctaa acagctttaa ccctgccaaa 960

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<211> 466
<212> PRT
<213> Arabidopsis thaliana

<400> 2

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Leu Ala Ile Gln Asp Ala Val Lys Leu Leu Leu Gln Gly Leu His Glu
35 40 45

Asp Val Asn Arg Glu Gly Ile Lys Lys Thr Pro Phe Arg Val Ala Lys
50 55 60

Ala Leu Arg Glu Gly Thr Arg Gly Tyr Lys Gln Lys Val Lys Asp Tyr
65 70 75 80

Val Gln Ser Ala Leu Phe Pro Glu Ala Gly Leu Asp Glu Gly Val Gly
85 90 95

Gln Ala Gly Gly Val Gly Gly Leu Val Val Val Arg Asp Leu Asp His
100 105 110

Tyr Ser Tyr Cys Glu Ser Cys Leu Leu Pro Phe His Val Lys Cys His
115 120 125

Ile Gly Tyr Val Pro Ser Gly Gln Arg Val Leu Gly Leu Ser Lys Phe
130 135 140

Ser Arg Val Thr Asp Val Phe Ala Lys Arg Leu Gln Asp Pro Gln Arg
145 150 155 160

Leu Ala Asp Asp Ile Cys Ser Ala Leu Gln His Trp Val Lys Pro Ala
165 170 175

Gly Val Ala Val Val Leu Glu Cys Ser His Ile His Phe Pro Ser Leu
180 185 190

Asp Leu Asp Ser Leu Asn Leu Ser Ser His Arg Gly Phe Val Lys Leu
195 200 205

Leu Val Ser Ser Gly Ser Gly Val Phe Glu Asp Glu Ser Ser Asn Leu
210 215 220

Trp Gly Glu Phe Gln Ser Phe Leu Met Phe Lys Gly Val Lys Thr Gln
225 230 235 240

Ala Leu Cys Arg Asn Gly Ser Ser Val Lys Glu Trp Cys Pro Ser Val
245 250 255

Lys Ser Ser Ser Lys Leu Ser Pro Glu Val Asp Pro Glu Met Val Ser

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            260                 265                 270

Ala Val Val Ser Ile Leu Lys Ser Leu Gly Glu Asp Pro Leu Arg Lys
        275                 280                 285

Glu Leu Ile Ala Thr Pro Thr Arg Phe Leu Lys Trp Met Leu Asn Phe
    290                 295                 300

Gln Arg Thr Asn Leu Glu Met Lys Leu Asn Ser Phe Asn Pro Ala Lys
305                 310                 315                 320

Val Asn Gly Glu Val Lys Glu Lys Arg Leu His Cys Glu Leu Asn Met
                325                 330                 335

Pro Phe Trp Ser Met Cys Glu His His Leu Leu Pro Phe Tyr Gly Val
            340                 345                 350

Val His Ile Gly Tyr Phe Cys Ala Glu Gly Ser Asn Pro Asn Pro Val
        355                 360                 365

Gly Ser Ser Leu Met Lys Ala Ile Val His Phe Tyr Gly Phe Lys Leu
    370                 375                 380

Gln Val Gln Glu Arg Met Thr Arg Gln Ile Ala Glu Thr Leu Ser Pro
385                 390                 395                 400

Leu Val Gly Gly Asp Val Ile Val Val Ala Glu Ala Gly His Thr Cys
                405                 410                 415

Met Ile Ser Arg Gly Ile Glu Lys Phe Gly Ser Ser Thr Ala Thr Ile
            420                 425                 430

Ala Val Leu Gly Arg Phe Ser Ser Asp Asn Ser Ala Arg Ala Met Phe
        435                 440                 445

Leu Asp Lys Ile His Thr Thr Asn Ala Leu Lys Thr Glu Ser Ser Ser
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Pro Phe
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<212> DNA
<213> Lycopersicon esculentum

<400> 3

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cagggtttgg gtgaagatat caatagggaa ggaatcaaga aaaccccttt tcgtgttgct    180

aaggctctaa gacaaggaac aagaggttac aaacaaaaag tgaatgatat tgttcatggc    240

gcattattcc ctgaagctgg attggagggt ggaagtggtc aggctggagg agttggtggg    300
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ctttctcggg ttgctgatat ttttgcaaaa cggctccaaa gtccacagcg ccttgctgat    480
gaagtttgca ctgctttgca gcatggaatc aagccaacag gcgttgctgt ggttctacag    540
tgtatgcata ttcattttcc aaattttgaa tcagcatttc tcgactcgac ttcccaagga    600
tgggtaaaga taacagctac ctcaggttct ggtgtttttg aagatgggaa tgctgatgtt    660
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gtcaacccgg tcggaagacc tctagtgcaa tcagtagtac atttttatgg ctttaaactc   1140
caagtacagg aaagggtaac cagacaaata gctgagactg tttcatcatt cttaggtgaa   1200
gacattatcg tagttgtgga agcaaatcac acctgtatga tatctagagg aatcgagaaa   1260
tttggaagca acacagccac atttgctgtg ttgggtcgat tttccactga ccctgttgca   1320
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<210> 4
<211> 456
<212> PRT
<213> Lycopersicon esculentum

<400> 4

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Val Ser Phe Glu Leu Gly Phe Glu Thr Gln Pro Glu Thr Leu Val Ile
            20                  25                  30

Gln Asp Ala Val Arg Val Leu Leu Gln Gly Leu Gly Glu Asp Ile Asn
        35                  40                  45

Arg Glu Gly Ile Lys Lys Thr Pro Phe Arg Val Ala Lys Ala Leu Arg
    50                  55                  60

Gln Gly Thr Arg Gly Tyr Lys Gln Lys Val Asn Asp Ile Val His Gly
65                  70                  75                  80

Ala Leu Phe Pro Glu Ala Gly Leu Glu Gly Gly Ser Gly Gln Ala Gly
                85                  90                  95

Gly Val Gly Gly Leu Val Ile Val Arg Asp Leu Asp Leu Phe Ser Tyr
            100                 105                 110
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Cys Glu Ser Cys Leu Leu Pro Phe Gln Val Lys Cys His Val Gly Tyr
        115                 120                 125

Val Pro Ser Gly Lys Arg Val Val Gly Leu Ser Lys Leu Ser Arg Val
    130                 135                 140

Ala Asp Ile Phe Ala Lys Arg Leu Gln Ser Pro Gln Arg Leu Ala Asp
145                 150                 155                 160

Glu Val Cys Thr Ala Leu Gln His Gly Ile Lys Pro Thr Gly Val Ala
                165                 170                 175

Val Val Leu Gln Cys Met His Ile His Phe Pro Asn Phe Glu Ser Ala
            180                 185                 190

Phe Leu Asp Ser Thr Ser Gln Gly Trp Val Lys Ile Thr Ala Thr Ser
        195                 200                 205

Gly Ser Gly Val Phe Glu Asp Gly Asn Ala Asp Val Trp Thr Asp Phe
    210                 215                 220

Trp Ser Leu Leu Lys Phe Arg Gly Ile Ser Ile Asp Asn Ala His Arg
225                 230                 235                 240

Arg Ser Ser Gly Gln Ser Trp Cys Pro Ser Gln Ser Cys Gly Met Pro
                245                 250                 255

Gly Gln Ala Asn Ser Ala Met Thr Asn Ala Val Asn Ser Ile Leu Lys
            260                 265                 270

Ser Leu Gly Glu Asp Pro Leu Arg Glu Glu Leu Val Glu Thr Pro Ser
        275                 280                 285

Arg Phe Val Lys Trp Phe Met Asn Phe Arg Asn Ser Asn Leu Glu Met
    290                 295                 300

Lys Leu Asn Gly Phe Val Arg Ser Arg Ile Asp Thr Arg Ser Pro Gln
305                 310                 315                 320

Gly Gly Asn Phe Asn Asp Gly Ile Cys Ser Glu Leu Asn Leu Ser Phe
                325                 330                 335

Trp Ser Gln Cys Glu His His Leu Leu Pro Phe Gln Gly Val Val His
            340                 345                 350

Ile Gly Tyr His Ser Ser Asp Gly Val Asn Pro Val Gly Arg Pro Leu
        355                 360                 365

Val Gln Ser Val Val His Phe Tyr Gly Phe Lys Leu Gln Val Gln Glu
    370                 375                 380

Arg Val Thr Arg Gln Ile Ala Glu Thr Val Ser Ser Phe Leu Gly Glu
385                 390                 395                 400
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Asp Ile Ile Val Val Val Glu Ala Asn His Thr Cys Met Ile Ser Arg
                405                 410                 415

Gly Ile Glu Lys Phe Gly Ser Asn Thr Ala Thr Phe Ala Val Leu Gly
            420                 425                 430

Arg Phe Ser Thr Asp Pro Val Ala Arg Ala Lys Phe Leu Gln Ser Leu
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Pro Asp Ser Gly Ser Ala Gly Arg
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<210> 5
<211> 1485
<212> DNA
<213> Oryza sativa

<400> 5

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ctcgtcgagg gggacggcga ggcggcggcc gccgacgcca tggagccggc ggtgcgcgcg    180
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gtcgccaagg ccttccgcga cggcacccga ggttacaagc aaaaagtaaa ggacattgtg    300
caggggctc tctttcctga ggttggtgtt gacaagagga ctggttctgc tggaggaact    360
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ctgcaatgtt ggcacatacc tttgccagaa aacttgaaat gcaagacttt gcaaggttgg    660
attagcactt cacattcatc tcgctctgga gtttttgagg gtgagagcag ctctttttgg    720
aatgacttct cagcccttct taagcttagg ggcatagaca tggagaggga cagccattct    780
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gctgctgacc atcgagcaat ccattctgag ctgcatttgc cattttgtgc gcagtgcgag   1140
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gccatagttg ttgtagaagc taaccacatt tgcatgatat caaggggaat agagaaaatc   1380
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<210> 6
<211> 495
<212> PRT
<213> Oryza sativa

<400> 6

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Tyr Glu Glu Glu Glu Glu Asp Asp Leu Val Glu Gly Asp Gly Glu Ala
35 40 45

Ala Ala Ala Asp Ala Met Glu Pro Ala Val Arg Ala Leu Leu Leu Gly
50 55 60

Leu Gly Glu Asp Ala Arg Arg Glu Gly Leu Arg Arg Thr Pro Lys Arg
65 70 75 80

Val Ala Lys Ala Phe Arg Asp Gly Thr Arg Gly Tyr Lys Gln Lys Val
85 90 95

Lys Asp Ile Val Gln Gly Ala Leu Phe Pro Glu Val Gly Val Asp Lys
100 105 110

Arg Thr Gly Ser Ala Gly Gly Thr Gly Gly Gln Val Val Val Arg Asp
115 120 125

Ile Asp Leu Phe Ser Tyr Cys Glu Ser Cys Leu Leu Pro Phe Ser Ile
130 135 140

Gln Phe His Val Gly Tyr Val Pro Ser Gly Gly Arg Val Val Gly Leu
145 150 155 160

Ser Lys Leu Ser Arg Val Ala Asp Val Phe Ala Lys Arg Leu Gln Asn
165 170 175

Pro Gln Arg Leu Ala Ser Glu Val Cys Gly Ala Leu His Ala Ser Ile
180 185 190

Gln Pro Ala Gly Val Ala Val Ala Leu Gln Cys Trp His Ile Pro Leu
195 200 205

Pro Glu Asn Leu Lys Cys Lys Thr Leu Gln Gly Trp Ile Ser Thr Ser
210 215 220

His Ser Ser Arg Ser Gly Val Phe Glu Gly Glu Ser Ser Ser Phe Trp
225 230 235 240

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Asn Asp Phe Ser Ala Leu Leu Lys Leu Arg Gly Ile Asp Met Glu Arg
                245                 250                 255

Asp Ser His Ser Ala Ser Ile Ala Trp Cys Pro Leu Arg Ser His Asp
            260                 265                 270

Val Pro Val Cys Asn Gly His Cys Lys Lys Ala Thr Thr Asn Gly Ala
        275                 280                 285

Ile Ser Pro Lys Ser Val Pro Ala Pro Ser Asn Met Val Ser Ala Val
    290                 295                 300

Ser Ser Met Leu Leu Ser Leu Gly Glu Asp Pro Phe Arg Lys Glu Leu
305                 310                 315                 320

Val Gly Thr Pro Gln Arg Tyr Val Gln Trp Leu Met Lys Phe Arg Ala
                325                 330                 335

Cys Asn Leu Asp Val Lys Leu Asn Gly Phe Thr Leu Asn Asn Leu Ser
            340                 345                 350

Val Tyr Gln Ser Pro Ala Gly Asp Ala Ala Asp His Arg Ala Ile His
        355                 360                 365

Ser Glu Leu His Leu Pro Phe Cys Ala Gln Cys Glu His His Leu Leu
    370                 375                 380

Pro Phe Tyr Gly Val Val His Ile Gly Tyr Leu Asp Gly Gly Asp Gly
385                 390                 395                 400

Glu Val Ile Asp Arg Ser His Phe Gln Ala Leu Val His Phe Tyr Gly
                405                 410                 415

Cys Lys Leu Gln Val Gln Glu Arg Met Thr Arg Gln Ile Ala Glu Ala
            420                 425                 430

Val Tyr Ser Val Ser His Cys Gly Ala Ile Val Val Val Glu Ala Asn
        435                 440                 445

His Ile Cys Met Ile Ser Arg Gly Ile Glu Lys Ile Arg Ser Ser Thr
    450                 455                 460

Ala Thr Ile Ala Val Leu Gly Gln Phe Leu Thr Asp Pro Ser Ala Lys
465                 470                 475                 480

Ala Arg Phe Leu Gln Asn Val Val Asp Thr Thr Gly Leu Ala Val
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<211> 1855
<212> DNA
<213> Triticum aestivum

<400> 7
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cggacgccca agcgcgtcgc caaggccttc cgcgacggca cccgaggtta cagacagaaa 300

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gaatcttgct tacttccgtt cagcatacaa tgccatgttg gatatgtgcc ctccggtgga 480

agggtcgttg ggttaagcaa gctttcaaga gtagctgacg tctttgccaa gagatttcaa 540

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ggtgttgctg ttgctatgca gtgctggcac ataccgttgc cggagaactt caaatgcaaa 660

aattcgcgag ctttgattag aacctcacat tcatctcgtt cgggagtttt tgagggcgag 720

aacagctcct tttggaatga ttttgtggct cttcttaagc ttagaggcat agacatggag 780

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ctaaggaaag aacttctagg cagtcctcag cgttacgtgc aatggctgat gaggttcaga 1020

gcatgcaatc ttgatgtgaa gctgaatggt tttacactta acagtgcaag tgtatatgag 1080

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ggcagtggag acggtgaagg gatcaaccgc tcacattttc aggctctggt tcatttctac 1260

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<210> 8
<211> 480
<212> PRT
<213> Triticum aestivum

<400> 8

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Glu Ala Pro Gly Asp Ala Met Glu Pro Ala Val Arg Ala Leu Leu Ala
        35                  40                  45

Gly Leu Gly Glu Asp Asp Arg Arg Glu Gly Leu Arg Arg Thr Pro Lys
    50                  55                  60

Arg Val Ala Lys Ala Phe Arg Asp Gly Thr Arg Gly Tyr Arg Gln Lys
65                  70                  75                  80

Val Lys Asp Ile Val Gln Gly Ala Leu Phe Pro Glu Val Gly Val Asp
                85                  90                  95

Lys Arg Thr Gly Ser Ala Gly Gly Thr Gly Gly Gln Val Val Val Arg
            100                 105                 110

Asp Ile Asp Leu Tyr Ser Tyr Cys Glu Ser Cys Leu Leu Pro Phe Ser
        115                 120                 125

Ile Gln Cys His Val Gly Tyr Val Pro Ser Gly Gly Arg Val Val Gly
    130                 135                 140

Leu Ser Lys Leu Ser Arg Val Ala Asp Val Phe Ala Lys Arg Phe Gln
145                 150                 155                 160

Asn Pro Gln Arg Leu Ala Asn Glu Val Cys Gly Ala Leu His Ala Ser
                165                 170                 175

Ile Gln Pro Ala Gly Val Ala Val Ala Met Gln Cys Trp His Ile Pro
            180                 185                 190

Leu Pro Glu Asn Phe Lys Cys Lys Asn Ser Arg Ala Leu Ile Arg Thr
        195                 200                 205

Ser His Ser Ser Arg Ser Gly Val Phe Glu Gly Glu Asn Ser Ser Phe
    210                 215                 220

Trp Asn Asp Phe Val Ala Leu Leu Lys Leu Arg Gly Ile Asp Met Glu
225                 230                 235                 240

Met Asp Ser Arg Ser Ala Ser Leu Thr Trp Cys Pro Leu Arg Pro His
                245                 250                 255

Glu Val Pro Leu Cys Asn Gly His Ala Lys Lys Ile Thr Thr Asn Gly
            260                 265                 270

Ala Ser Ser Ala Lys Ser Ala Ser Ile Pro Ser Asn Met Val Ser Ala
        275                 280                 285

Val Ser Ser Met Leu Leu Ser Leu Gly Glu Asp Pro Leu Arg Lys Glu
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    290                 295                 300

Leu Leu Gly Ser Pro Gln Arg Tyr Val Gln Trp Leu Met Arg Phe Arg
305                 310                 315                 320

Ala Cys Asn Leu Asp Val Lys Leu Asn Gly Phe Thr Leu Asn Ser Ala
                325                 330                 335

Ser Val Tyr Glu Arg Pro Gly Glu Asp Ala Thr Asp His Arg Ala Ile
            340                 345                 350

Gly Ser Glu Leu His Leu Pro Phe Cys Ala Gln Cys Glu His His Leu
        355                 360                 365

Leu Pro Phe Tyr Gly Val Val His Ile Gly Tyr Phe Gly Ser Gly Asp
    370                 375                 380

Gly Glu Gly Ile Asn Arg Ser His Phe Gln Ala Leu Val His Phe Tyr
385                 390                 395                 400

Gly Cys Lys Leu Gln Val Gln Glu Arg Met Thr Arg Gln Ile Ala Glu
                405                 410                 415

Ala Val Tyr Ser Val Ser His Arg Gly Ala Ile Val Val Val Glu Ala
            420                 425                 430

Asn His Ile Cys Met Ile Ser Arg Gly Ile Glu Lys Ile Arg Ser Ser
        435                 440                 445

Thr Ala Thr Ile Ala Val Leu Gly Gln Phe Ser Thr Asp Ser Ser Ala
    450                 455                 460

Lys Ala Ser Phe Leu Gln Asn Val Leu Asp Thr Ala Asn Gln Glu Val
465                 470                 475                 480
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<210> 9
<211> 1479
<212> DNA
<213> Zea mays

<400> 9

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cagaactgtt tatacaagga agagtgacat atgtgatatg tgaggatgtt ttttttgca     180

taacctttg ttttaatgaa gatatgtggg gtcttattca tcatctctac ttttgtttta     240

attgcttcat gatctgtatt taacatatat ctaaatctac aggctacagg caaaaagtaa    300

aagacatagt gcaaggtgct ctgtttccag aggttggtgt ggataaaagg actggatctg    360

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catgcttgct tccattcagc atacagtgcc atgtcgggta tgttccctca ggtggaagag    480

tggttgggtt aagcaagctt tctagagtat ctgatgtctt tgccaagaga ttgcaaaacc    540
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35 40 45

Ser Tyr Cys Glu Ser Cys Leu Leu Pro Phe Ser Ile Gln Cys His Val
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Gly Tyr Val Pro Ser Gly Gly Arg Val Val Gly Leu Ser Lys Leu Ser
65 70 75 80

Arg Val Ser Asp Val Phe Ala Lys Arg Leu Gln Asn Pro Gln Arg Leu
85 90 95

Ala Asn Glu Ile Cys Gly Ala Leu His Ala Ser Ile Gln Pro Ala Gly
100 105 110

Val Ala Val Ala Leu Gln Cys Trp His Ile Pro Leu Pro Glu Asn Leu
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Ser Gly Val Phe Glu Gly Glu Ser Ser Thr Phe Trp Ser Asp Phe Leu
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Ala Leu Val Lys Leu Arg Gly Ile Asp Val Glu Ala Lys Asp Arg Thr
                165                 170                 175

Val Ser Ile Pro Trp Cys Pro Leu Arg Ser His Glu Val Pro Leu Ser
            180                 185                 190

Asn Gly Leu Cys Lys Lys Asn Ser Thr Asn Gly Met Val Ser Ala Val
        195                 200                 205

Thr Ser Met Leu Leu Ser Leu Gly Glu Asp Pro Leu Arg Lys Glu Leu
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Leu Gly Thr Pro Gln Arg Tyr Val Gln Trp Leu Met Lys Phe Lys Ala
225                 230                 235                 240

Cys Asn Leu Leu Asp Val Lys Leu Asn Gly Phe Thr Leu Ser Asn Val
                245                 250                 255

Ser Leu Tyr Glu Arg Thr Gly Gly Gly Thr Thr Asp His Gly Ala Ile
            260                 265                 270

Arg Ser Glu Leu His Leu Pro Phe Cys Ala Gln Cys Glu His His Leu
        275                 280                 285

Leu Pro Phe Tyr Gly Val Val His Ile Gly Tyr Phe Gly Asn Gly Ser
    290                 295                 300

Gly Glu Gly Ile Asp Arg Ser His Phe Gln Ala Leu Val His Phe Tyr
305                 310                 315                 320

Gly Cys Lys Leu Gln Val Gln Glu Arg Met Thr Arg Gln Ile Ala Glu
                325                 330                 335

Ala Val Tyr Ser Val Ser His Asn Gly Ala Met Val Val Val Glu Ala
            340                 345                 350

Asn His Ile Cys Met Ile Ser Arg Gly Ile Glu Lys Ile Arg Ser Asn
        355                 360                 365

Thr Ala Thr Ile Ala Val Leu Gly Gln Phe Leu Ala Asp Pro Ser Ala
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Lys Ala Cys Phe Leu Gln Asn Val Leu Asp Ser Val Gly Ser Ala Val
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Pro Lys Trp Lys Lys Ser Phe Ile Ser Leu Pro Cys Arg Ser Lys Thr
        35                  40                  45

Thr Arg Lys Val Leu Ala Ser Ser Arg Tyr Val Pro Gly Lys Leu Glu
    50                  55                  60

Asp Leu Ser Val Val Lys Lys Ser Leu Pro Arg Arg Glu Pro Val Glu
65                  70                  75                  80

Lys Leu Gly Phe Val Arg Thr Leu Leu Ile Asp Asn Tyr Asp Ser Tyr
                85                  90                  95

Thr Phe Asn Ile Tyr Gln Ala Leu Ser Thr Ile Asn Gly Val Pro Pro
            100                 105                 110

Val Val Ile Arg Asn Asp Glu Trp Thr Trp Glu Glu Ala Tyr His Xaa
        115                 120                 125

Leu Tyr Glu Asp Val Ala Phe Asp Asn Ile Val Ile Ser Pro Gly Pro
    130                 135                 140

Gly Ser Pro Met Cys Pro Ala Asp Ile Gly Ile Cys Leu Arg Leu Leu
145                 150                 155                 160

Leu Glu Cys Arg Asp Ile Pro Ile Leu Gly Val Cys Leu Gly His Gln
                165                 170                 175

Ala Leu Gly Tyr Val His Gly Ala His Val Val His Ala Pro Glu Pro
            180                 185                 190

Val His Gly Arg Leu Ser Gly Ile Glu His Asp Gly Asn Ile Leu Phe
        195                 200                 205

Ser Asp Ile Pro Ser Gly Arg Asn Ser Asp Phe Lys Val Val Arg Tyr
    210                 215                 220

His Ser Leu Ile Ile Asp Lys Glu Ser Leu Pro Lys Glu Leu Val Pro
225                 230                 235                 240

Ile Ala Trp Thr Ile Tyr Asp Asp Thr Gly Ser Phe Ser Glu Lys Asn
                245                 250                 255

Ser Cys Val Pro Val Asn Asn Thr Gly Ser Pro Leu Gly Asn Gly Ser
            260                 265                 270
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Val Ile Pro Val Ser Glu Lys Leu Glu Asn Arg Ser His Trp Pro Ser
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Ser His Val Asn Gly Lys Gln Asp Arg His Ile Leu Met Gly Ile Met
    290                 295                 300

His Ser Ser Phe Pro His Tyr Gly Leu Gln Phe His Pro Glu Ser Ile
305                 310                 315                 320

Ala Thr Thr Tyr Gly Ser Gln Leu Phe Lys Asn Phe Lys Asp Ile Thr
                325                 330                 335

Val Asn Tyr Trp Ser Arg Cys Lys Ser Thr Ser Leu Arg Arg Arg Asn
            340                 345                 350

Ile Asn Asp Thr Ala Asn Met Gln Val Pro Asp Ala Thr Gln Leu Leu
        355                 360                 365

Lys Glu Leu Ser Arg Thr Arg Cys Thr Gly Asn Gly Ser Ser Tyr Phe
    370                 375                 380

Gly Asn Pro Lys Ser Leu Phe Ser Ala Lys Thr Asn Gly Val Asp Val
385                 390                 395                 400

Phe Asp Met Val Asp Ser Ser Tyr Pro Lys Pro His Thr Lys Leu Leu
                405                 410                 415

Arg Leu Lys Trp Lys Lys His Glu Arg Leu Ala His Lys Val Gly Gly
            420                 425                 430

Val Arg Asn Ile Phe Met Glu Leu Phe Gly Lys Asn Arg Gly Asn Asp
        435                 440                 445

Thr Phe Trp Leu Asp Thr Ser Ser Ser Asp Lys Ala Arg Gly Arg Phe
    450                 455                 460

Ser Phe Met Gly Gly Lys Gly Gly Ser Leu Trp Lys Gln Leu Thr Phe
465                 470                 475                 480

Ser Leu Ser Asp Gln Ser Glu Val Thr Ser Lys His Ala Gly His Leu
                485                 490                 495

Leu Ile Glu Asp Ser Gln Ser Ser Thr Glu Lys Gln Phe Leu Glu Glu
            500                 505                 510

Gly Phe Leu Asp Phe Leu Arg Lys Glu Leu Ser Ser Ile Ser Tyr Asp
        515                 520                 525

Glu Lys Asp Phe Glu Glu Leu Pro Phe Asp Phe Cys Gly Gly Tyr Val
    530                 535                 540

Gly Cys Ile Gly Tyr Asp Ile Lys Val Glu Cys Gly Met Pro Ile Asn
545                 550                 555                 560
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Arg His Lys Ser Asn Ala Pro Asp Ala Cys Phe Phe Phe Ala Asp Asn
                565                 570                 575

Val Val Ala Ile Asp His Gln Leu Asp Asp Val Tyr Ile Leu Ser Leu
            580                 585                 590

Tyr Glu Glu Gly Thr Ala Glu Thr Ser Phe Leu Asn Asp Thr Glu Glu
        595                 600                 605

Lys Leu Ile Ser Leu Met Gly Leu Ser Thr Arg Lys Leu Glu Asp Gln
    610                 615                 620

Thr Leu Pro Val Ile Asp Ser Ser Gln Ser Lys Thr Ser Phe Val Pro
625                 630                 635                 640

Asp Lys Ser Arg Glu Gln Tyr Ile Asn Asp Val Gln Ser Cys Met Lys
                645                 650                 655

Tyr Ile Lys Asp Gly Glu Ser Tyr Glu Leu Cys Leu Thr Thr Gln Asn
            660                 665                 670

Arg Arg Lys Ile Gly Asn Ala Asp Pro Leu Gly Leu Tyr Leu His Leu
        675                 680                 685

Arg Glu Arg Asn Pro Ala Pro Tyr Ala Ala Phe Leu Asn Phe Ser Asn
    690                 695                 700

Ala Asn Leu Ser Leu Cys Ser Ser Ser Pro Glu Arg Phe Leu Lys Leu
705                 710                 715                 720

Asp Arg Asn Gly Met Leu Glu Ala Lys Pro Ile Lys Gly Thr Ile Ala
                725                 730                 735

Arg Gly Ser Thr Pro Glu Glu Asp Glu Phe Leu Lys Leu Gln Leu Lys
            740                 745                 750

Leu Ser Glu Lys Asn Gln Ala Glu Asn Leu Met Ile Val Asp Leu Leu
        755                 760                 765

Arg Asn Asp Leu Gly Arg Val Cys Glu Pro Gly Ser Val His Val Pro
    770                 775                 780

Asn Leu Met Asp Val Glu Ser Tyr Thr Thr Val His Thr Met Val Ser
785                 790                 795                 800

Thr Ile Arg Gly Leu Lys Lys Thr Asp Ile Ser Pro Val Glu Cys Val
                805                 810                 815

Arg Ala Ala Phe Pro Gly Gly Ser Met Thr Gly Ala Pro Lys Leu Arg
            820                 825                 830

Ser Val Glu Ile Leu Asp Ser Leu Glu Asn Cys Ser Arg Gly Leu Tyr
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835 840 845

Ser Gly Ser Ile Gly Tyr Phe Ser Tyr Asn Gly Thr Phe Asp Leu Asn
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Ile Val Ile Xaa Xaa Val Ile Ile His Glu Asp Glu Ala Ser Ile Gly
865 870 875 880

Ala Gly Gly Ala Ile Val Ala Leu Ser Ser Pro Glu Asp Glu Phe Glu
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Glu Met Ile Leu Lys Thr Arg Ala Pro Xaa Asn Ala Val Met Glu Phe
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Xaa Ser Asp Gln Arg Arg Gln
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cctggacatt tggatgcatc gggaacaaga aaaaagtttt tacatgagcc agttccgaag 240

ttagaatttg tacgcacact actaattgac aactatgaca gttacactta caatattttc 300

caagagctct caatcattaa tggaatgcct ccggtggtga ttcggaatga tgagtggaca 360

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35 40 45

Lys Glu Arg Lys Val Phe Ile Ser Ser His Leu Val Pro Gly His Leu

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    50                  55                  60

Asp Ala Ser Gly Thr Arg Lys Lys Phe Leu His Glu Pro Val Pro Lys
65                  70                  75                  80

Leu Glu Phe Val Arg Thr Leu Leu Ile Asp Asn Tyr Asp Ser Tyr Thr
                85                  90                  95

Tyr Asn Ile Phe Gln Glu Leu Ser Ile Ile Asn Gly Met Pro Pro Val
            100                 105                 110

Val Ile Arg Asn Asp Glu Trp Thr Trp Lys Glu Val Tyr His Tyr Leu
        115                 120                 125

Tyr Glu Glu Arg Thr Phe Asp Asn Ile Val Ile Ser Pro Gly Pro Gly
    130                 135                 140

Ser Pro Thr Cys Pro Ser Asp Ile Gly Ile Cys Leu Arg Leu Leu Leu
145                 150                 155                 160

Glu Cys Ile Asp Ile Pro Ile Leu Gly Val Cys Leu Gly His Gln Ala
                165                 170                 175

Leu Gly Tyr Val His Gly Ala Glu Val Val His Ala Pro Glu Pro Phe
            180                 185                 190

His Gly Arg Leu Ser Asp Ile Glu His Asn Gly Cys Gln Leu Phe His
        195                 200                 205

Glu Ile Pro Ser Gly Arg Ser Ser Gly Phe Lys Val Val Arg Tyr His
    210                 215                 220

Ser Leu Val Ile Asp Pro Lys Ser Leu Pro Lys Glu Leu Ile Pro Ile
225                 230                 235                 240

Ala Trp Thr Ser Thr Ala Glu Thr Leu Pro Phe Gln Gly Val Lys Arg
                245                 250                 255

Ser Asn Ser Phe Leu Asn Ala Ser Lys Glu Asn Lys Asp Ile Phe Asn
            260                 265                 270

Gly Met Ser Glu Leu Ser Asp Asp Ser Lys Asp Val Lys Gly Gly Lys
        275                 280                 285

Val Leu Met Gly Ile Met His Ser Ser Arg Pro His Tyr Gly Leu Gln
    290                 295                 300

Phe His Pro Glu Ser Val Ala Thr Cys Tyr Gly Arg Gln Leu Phe Lys
305                 310                 315                 320

Asn Phe Arg Lys Ile Thr Glu Asp Tyr Trp Leu Leu Leu Met Ser Thr
                325                 330                 335
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Ser Phe Asn Glu Arg Arg Ala His Tyr Ala Ala Cys Met Gln Val Pro
            340                 345                 350

Asn Leu Asp Pro Leu Ser Arg Ser Val Ala Lys Arg Gly His Leu Val
        355                 360                 365

Asn Lys Leu Ile Glu Arg Arg Thr Ala Glu Val Asp Gly Thr Leu Asn
    370                 375                 380

Leu Ser His Pro Gly His Ser Val Lys Phe Leu Lys Met Thr Trp Lys
385                 390                 395                 400

Lys Leu Asp Cys Ser Ala Ser Gln Val Gly Gly Ala Asp Asn Ile Phe
                405                 410                 415

Cys Glu Leu Phe Gly Asp Gln Glu Ala Lys Asn Ser Phe Trp Leu Asp
            420                 425                 430

Ser Ser Ser Ile Glu Lys Glu Arg Ala Arg Phe Ser Phe Met Gly Gly
        435                 440                 445

Lys Gly Gly Ser Leu Trp Lys Gln Leu Ser Phe Arg Leu Ser Asn Arg
    450                 455                 460

Ser Asp Arg Met Cys Lys Gly Gly Gly His Leu Ser Val Glu Asp Ala
465                 470                 475                 480

Asn Gly His Val Ile Ser Lys Phe Leu Glu Asp Gly Phe Phe Asp Tyr
                485                 490                 495

Leu Asp Lys Glu Leu Leu Ser Phe Cys Phe Asp Glu Lys Asp Tyr Glu
            500                 505                 510

Gly Leu Pro Phe Asp Phe Tyr Gly Gly Tyr Ile Gly Tyr Ile Gly Tyr
        515                 520                 525

Asp Leu Lys Ala Glu Cys Gly Val Ala Ser Asn Arg His Arg Ser Lys
    530                 535                 540

Thr Pro Asp Ala Cys Leu Phe Phe Thr Asp Asn Val Ile Val Ile Asp
545                 550                 555                 560

His Gln Tyr Asp Asp Ile Tyr Thr Leu Ser Leu His Asp Gly Ser Thr
                565                 570                 575

Ser Thr Thr Ser Arg Leu Glu Asp Leu Glu Gln Arg Leu Leu Asn Leu
            580                 585                 590

Arg Ala Phe Thr Pro Arg Arg Leu Gln Ser Gln Ala Ser Arg Gly Phe
        595                 600                 605

Ser Val Val Glu Leu Lys Ser Gly Phe Ser Ala Glu Lys Ser Arg Glu
    610                 615                 620
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Gln Tyr Ile Lys Asp Val Glu Asn Cys Gln Glu Phe Ile Lys Glu Gly
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Glu Ser Tyr Glu Leu Cys Leu Thr Thr Gln Met Arg Met Lys Leu Gly
                645                 650                 655

Gly Ile Asp Ser Leu Glu Leu Tyr Arg Asn Leu Arg Ile Arg Asn Pro
            660                 665                 670

Ala Pro Tyr Ala Ala Trp Leu Asn Phe Ser Arg Glu Asn Leu Ser Ile
        675                 680                 685

Cys Cys Ser Ser Pro Glu Arg Phe Leu Arg Leu Asp Arg Asn Ala Ile
    690                 695                 700

Leu Glu Ala Lys Pro Ile Lys Gly Thr Ile Ala Arg Gly Ser Thr Pro
705                 710                 715                 720

Lys Glu Asp Glu Phe Leu Lys Leu Gln Leu Glu Cys Ser Glu Lys Asp
                725                 730                 735

Gln Ala Glu Asn Leu Met Ile Val Asp Leu Leu Arg Asn Asp Leu Gly
            740                 745                 750

Arg Val Cys Glu Thr Gly Ser Val His Val Pro His Leu Met Glu Ile
        755                 760                 765

Glu Ser Tyr Ala Thr Val His Thr Met Val Ser Thr Ile Arg Gly Lys
    770                 775                 780

Lys Arg Ser Asp Ala Ser Ala Ile Asp Cys Val Arg Ala Ala Phe Pro
785                 790                 795                 800

Gly Gly Ser Met Thr Gly Ala Pro Lys Leu Arg Ser Met Glu Leu Leu
                805                 810                 815

Asp His Leu Glu Asn Cys Ser Arg Gly Ile Tyr Ser Gly Cys Ile Gly
            820                 825                 830

Phe Phe Ser Tyr Asn Gln Ala Phe Asp Leu Asn Ile Val Ile Arg Thr
        835                 840                 845

Val Val Ile His Glu Gly Glu Ala Ser Val Gly Ala Gly Gly Ala Ile
    850                 855                 860

Thr Ala Leu Ser Asp Pro Asn Asp Glu Tyr Glu Glu Met Leu Leu Lys
865                 870                 875                 880

Thr Arg Ala Pro Ile Lys Ala Val Leu Glu His Gln Ser Ser Ile Phe
                885                 890                 895

Ser Ser Asp Ala Gln Lys
            900
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<210> 15
<211> 2688
<212> DNA
<213> Oryza sativa

<400> 15
atggccgccc tccgcctccc caccccgccg ccgccccgcg cccccgcgcc gtggctccat 60

tcttcccacc gccgtcgggt tgcggcgccg cggggcgcgg gcgggggcgg gggcgggggc 120

ggggcggtcc cgccgccgcc ggtgaggacg ctcctgatcg acaactacga cagctacacc 180

tacaacatct tccaggagct ctccgtcgtc aacggcgtgc cgccggtggt ggtgcgcaac 240

gacgagtgga cgtggaggga cgtgtacagg tgggtgtaca aggagagggc cttcgacaac 300

atcgtcatct cgcctggccc gggatctccg gcctgcccta gcgacatagg tataggcctg 360

cggatacttt gcgagtgtgg agatataccc atcctgggtg tctgccttgg ccaccaggcc 420

ctgggatttg tccatggtgc taaaatcgtc catgctcctg aagctataca tggccggctt 480

agtgaacttg aacacaatgg atgctacctc tttaatcaca tcccatcagg tataaactct 540

ggattcaagg tagtgcgcta tcactcactt gtaatagaac cagactctct atctgaggat 600

cttatatcaa tagcatggac tgcttctcca aaaatgctct cattccttga aagcgataag 660

cctgatataa ctagcagtac cttgtgggga tcattggata acttattcgt aacaaaccag 720

tcagagtgca gtaccactga tggaaaaatg cccagcataa acgatgcaag tgagttagat 780

ggctacaggg ttctcatggg cgttaggcac tctaccaggc ctcactatgg agtgcagttt 840

caccccgaga gtgttgctac tcattatgga agacagatat ttcaaaactt caagaagata 900

acaactgact ttggattaca gacaccattg cttcaggaaa gaaaggttca cagtattggt 960

aaactggaaa gatcccaaat cagttctcca gatctcaaga actttgttgc aaatgacttg 1020

ttacattctg caaggttgaa actttgggat tctgttgggc cttgtgctct tccaaagcga 1080

agcagtgggg acaaatgctt acggttgcaa tggaaaaaga ttgataactt cctcaatcgc 1140

ataggtggct ctgaaaacat tttttcagtg ctttttggcc atcatagcgc tgaagataca 1200

ttttggctgg atagctcatc agttgaccag aatagggcac gattttcatt catgggcggc 1260

aagggcgggc ccctttggaa gcaaatgaca tttcaccttg ccagtcaacg agccaattgt 1320

ggaggaaacc ttactattcg agatgcttat ggttgtactg tcagaaactt tctcaaggat 1380

ggtttcttgg atttccttga caaggagatg caatccattc aatacattga aaaggattat 1440

gaaggacttc catttgactt ccatggtgga tttgttggat acataggata tggtcttaaa 1500

gttgaatgcg atgcatcatc taatagtgca aaatcaagta cccctgatgc atgcttcttc 1560

tttgctgata acctagttgt ggttgatcac aacaatgggg atgtgtacat tttatcatta 1620

catgatgaat attcttctgg taatggagat ggagattacc aaaactcaat acatagttta 1680

tggttagcaa atactgagaa gaagcttctc aggatggatg ccatggcccc aagattatcg 1740

atcaatggaa actcgtcgat caatgggaac tcatttacca tatcatccag tgtgaataag 1800

caaagatttg tcatcgagaa atcaaaagat gaatatatca gagatgtgca gagttgcctg 1860

gattacataa gagacggaga aagctatgaa ttgtgcttaa ctactcagat gaagagaaga 1920

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acggattata tggatgcttt gaaactctac ctgaaattgc gaaaacaaaa tccagcccct   1980

tatgcagctt ggcttaactt ctcctcagaa aacctgagta tatgttgctc ttctcctgaa   2040

aggtttctgc gactagaccg aaatgcaatt ctggaagcaa agccaatcaa aggtactata   2100

gcacgtggca gaacaccaga ggaagatgaa tgcctacgtt tgcagttgaa atacagtgaa   2160

aaagatcaag ctgagaactt gatgattgtt gacctcctaa gaaacgatct tggtaaggtt   2220

tgtgaacctg ggagtgtgca tgttcctcgc ctcatggatg tggaatcata taaaactgta   2280

cataccatgg taagtaccat tcgtggaacc aaaatgtcgg acctaagccc tgtcgattgt   2340

gtaaaggctg cctttccagg aggttcaatg accggggccc cgaaagttag atccatggag   2400

attcttgatt cacttgaaac tagtccgaga ggaatatact caggatcagt tggattcttt   2460

tcatataaca agacttttga cttgaatatc gtgatcagaa cagttgtcct gcacaatgga   2520

gaagcttcga ttggggcagg cggggctatt gtagcattgt cagatccaga agcagagtac   2580

aatgagatgc tgcttaaagc aaaagctcca acaaaggtgg ttgaagagtg cagtcaacaa   2640

atatacaacc cagatcgttc ggattcaatg cagacaaccg taagttag               2688
```

<210> 16
<211> 895
<212> PRT
<213> Oryza sativa

<400> 16

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Met Ala Ala Leu Arg Leu Pro Thr Pro Pro Pro Pro Arg Ala Pro Ala
1               5                   10                  15

Pro Trp Leu His Ser Ser His Arg Arg Arg Val Ala Ala Pro Arg Gly
            20                  25                  30

Ala Gly Gly Gly Gly Gly Gly Gly Gly Ala Val Pro Pro Pro Pro Val
        35                  40                  45

Arg Thr Leu Leu Ile Asp Asn Tyr Asp Ser Tyr Thr Tyr Asn Ile Phe
    50                  55                  60

Gln Glu Leu Ser Val Val Asn Gly Val Pro Pro Val Val Val Arg Asn
65                  70                  75                  80

Asp Glu Trp Thr Trp Arg Asp Val Tyr Arg Trp Val Tyr Lys Glu Arg
                85                  90                  95

Ala Phe Asp Asn Ile Val Ile Ser Pro Gly Pro Gly Ser Pro Ala Cys
            100                 105                 110

Pro Ser Asp Ile Gly Ile Gly Leu Arg Ile Leu Cys Glu Cys Gly Asp
        115                 120                 125

Ile Pro Ile Leu Gly Val Cys Leu Gly His Gln Ala Leu Gly Phe Val
    130                 135                 140
```

```
His Gly Ala Lys Ile Val His Ala Pro Glu Ala Ile His Gly Arg Leu
145                 150                 155                 160

Ser Glu Leu Glu His Asn Gly Cys Tyr Leu Phe Asn His Ile Pro Ser
                165                 170                 175

Gly Ile Asn Ser Gly Phe Lys Val Val Arg Tyr His Ser Leu Val Ile
            180                 185                 190

Glu Pro Asp Ser Leu Ser Glu Asp Leu Ile Ser Ile Ala Trp Thr Ala
        195                 200                 205

Ser Pro Lys Met Leu Ser Phe Leu Glu Ser Asp Lys Pro Asp Ile Thr
    210                 215                 220

Ser Ser Thr Leu Trp Gly Ser Leu Asp Asn Leu Phe Val Thr Asn Gln
225                 230                 235                 240

Ser Glu Cys Ser Thr Thr Asp Gly Lys Met Pro Ser Ile Asn Asp Ala
                245                 250                 255

Ser Glu Leu Asp Gly Tyr Arg Val Leu Met Gly Val Arg His Ser Thr
            260                 265                 270

Arg Pro His Tyr Gly Val Gln Phe His Pro Glu Ser Val Ala Thr His
        275                 280                 285

Tyr Gly Arg Gln Ile Phe Gln Asn Phe Lys Lys Ile Thr Thr Asp Phe
    290                 295                 300

Gly Leu Gln Thr Pro Leu Leu Gln Glu Arg Lys Val His Ser Ile Gly
305                 310                 315                 320

Lys Leu Glu Arg Ser Gln Ile Ser Ser Pro Asp Leu Lys Asn Phe Val
                325                 330                 335

Ala Asn Asp Leu Leu His Ser Ala Arg Leu Lys Leu Trp Asp Ser Val
            340                 345                 350

Gly Pro Cys Ala Leu Pro Lys Arg Ser Ser Gly Asp Lys Cys Leu Arg
        355                 360                 365

Leu Gln Trp Lys Lys Ile Asp Asn Phe Leu Asn Arg Ile Gly Gly Ser
    370                 375                 380

Glu Asn Ile Phe Ser Val Leu Phe Gly His His Ser Ala Glu Asp Thr
385                 390                 395                 400

Phe Trp Leu Asp Ser Ser Ser Val Asp Gln Asn Arg Ala Arg Phe Ser
                405                 410                 415

Phe Met Gly Gly Lys Gly Gly Pro Leu Trp Lys Gln Met Thr Phe His
            420                 425                 430
```

```
Leu Ala Ser Gln Arg Ala Asn Cys Gly Gly Asn Leu Thr Ile Arg Asp
        435                 440                 445

Ala Tyr Gly Cys Thr Val Arg Asn Phe Leu Lys Asp Gly Phe Leu Asp
    450                 455                 460

Phe Leu Asp Lys Glu Met Gln Ser Ile Gln Tyr Ile Glu Lys Asp Tyr
465                 470                 475                 480

Glu Gly Leu Pro Phe Asp Phe His Gly Gly Phe Val Gly Tyr Ile Gly
                485                 490                 495

Tyr Gly Leu Lys Val Glu Cys Asp Ala Ser Ser Asn Ser Ala Lys Ser
            500                 505                 510

Ser Thr Pro Asp Ala Cys Phe Phe Phe Ala Asp Asn Leu Val Val Val
        515                 520                 525

Asp His Asn Asn Gly Asp Val Tyr Ile Leu Ser Leu His Asp Glu Tyr
    530                 535                 540

Ser Ser Gly Asn Gly Asp Gly Asp Tyr Gln Asn Ser Ile His Ser Leu
545                 550                 555                 560

Trp Leu Ala Asn Thr Glu Lys Lys Leu Leu Arg Met Asp Ala Met Ala
                565                 570                 575

Pro Arg Leu Ser Ile Asn Gly Asn Ser Ser Ile Asn Gly Asn Ser Phe
            580                 585                 590

Thr Ile Ser Ser Ser Val Asn Lys Gln Arg Phe Val Ile Glu Lys Ser
        595                 600                 605

Lys Asp Glu Tyr Ile Arg Asp Val Gln Ser Cys Leu Asp Tyr Ile Arg
    610                 615                 620

Asp Gly Glu Ser Tyr Glu Leu Cys Leu Thr Thr Gln Met Lys Arg Arg
625                 630                 635                 640

Thr Asp Tyr Met Asp Ala Leu Lys Leu Tyr Leu Lys Leu Arg Lys Gln
                645                 650                 655

Asn Pro Ala Pro Tyr Ala Ala Trp Leu Asn Phe Ser Ser Glu Asn Leu
            660                 665                 670

Ser Ile Cys Cys Ser Ser Pro Glu Arg Phe Leu Arg Leu Asp Arg Asn
        675                 680                 685

Ala Ile Leu Glu Ala Lys Pro Ile Lys Gly Thr Ile Ala Arg Gly Arg
    690                 695                 700

Thr Pro Glu Glu Asp Glu Cys Leu Arg Leu Gln Leu Lys Tyr Ser Glu
705                 710                 715                 720
```

```
Lys Asp Gln Ala Glu Asn Leu Met Ile Val Asp Leu Leu Arg Asn Asp
                725                 730                 735

Leu Gly Lys Val Cys Glu Pro Gly Ser Val His Val Pro Arg Leu Met
            740                 745                 750

Asp Val Glu Ser Tyr Lys Thr Val His Thr Met Val Ser Thr Ile Arg
        755                 760                 765

Gly Thr Lys Met Ser Asp Leu Ser Pro Val Asp Cys Val Lys Ala Ala
    770                 775                 780

Phe Pro Gly Gly Ser Met Thr Gly Ala Pro Lys Val Arg Ser Met Glu
785                 790                 795                 800

Ile Leu Asp Ser Leu Glu Thr Ser Pro Arg Gly Ile Tyr Ser Gly Ser
                805                 810                 815

Val Gly Phe Phe Ser Tyr Asn Lys Thr Phe Asp Leu Asn Ile Val Ile
            820                 825                 830

Arg Thr Val Val Leu His Asn Gly Glu Ala Ser Ile Gly Ala Gly Gly
        835                 840                 845

Ala Ile Val Ala Leu Ser Asp Pro Glu Ala Glu Tyr Asn Glu Met Leu
    850                 855                 860

Leu Lys Ala Lys Ala Pro Thr Lys Val Val Glu Glu Cys Ser Gln Gln
865                 870                 875                 880

Ile Tyr Asn Pro Asp Arg Ser Asp Ser Met Gln Thr Thr Val Ser
                885                 890                 895
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<210> 17
<211> 1122
<212> DNA
<213> Arabidopsis thaliana

<400> 17

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gttccatgtc ctttaagaca tggctttcga ttcccgcgtc ggttgacacg aagaagaacg    120

attctcatgt gttctgattc aagctctcag tcgtggaatg ttcctgtttt atctagctat    180

gaggttggtg agaggctaaa actagcaaga ggaggacaac agttcttggc catgtactca    240

agtgttgttg atggaattac aaccgatcca gcagcgatgg ttcttccatt ggatgatcac    300

atggttcacc gtggtcatgg agtctttgac actgccctga tcatcaatgg atacctttat    360

gaattggatc agcaccttga ccgtatcttg cgatctgcat caatggctaa gatcccactt    420

ccattcgatc gagaaactat taaaagaatt ctcattcaaa ccgtgagcgt ttctggatgt    480

agagatggat ctctaagata ctggctctct gcagggccag gggatttcct cctatctcca    540

tctcaatgtc tcaaaccaac tctctatgcc attgttataa aaacgaactt cgccattaac    600
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ccaataggtg tcaaggtagt gacctcgtcc atccccataa agcctccaga gtttgccacg 660

gtgaaaagtg ttaactacct ccctaacgta ctctcacaaa tggaagctga ggccaaagga 720

gcttatgcag gtatttgggt gtgtaaagat gggtttattg cagaaggccc gaacatgaat 780

gtggcgtttg ttgttaatgg tggtaaggag cttgtgatgc cgcggtttga taacgttttg 840

agcggatgta cagcaaagag aacacttaca ctcgctgaac agcttgtaag caaggggatt 900

cttaaaactg tgaaagtaat ggatgtgaca gtcgaagatg gaaagaaagc agatgagatg 960

atgcttattg gtagtggaat tccgatcaga cctgtgattc aatgggatga agaatttatt 1020

ggtgaaggaa aagaaggtcc tatagcaaag gcgcttcttg atctgttact tgaagatatg 1080

agatctggtc caccttccgt tcgtgttctt gttccttact ga 1122

<210> 18
<211> 373
<212> PRT
<213> Arabidopsis thaliana

<400> 18

Met Ala Gly Leu Ser Leu Glu Phe Thr Val Asn Thr Trp Asn Leu Arg
1 5 10 15

Ser Leu Ser Gln Val Pro Cys Pro Leu Arg His Gly Phe Arg Phe Pro
20 25 30

Arg Arg Leu Thr Arg Arg Arg Thr Ile Leu Met Cys Ser Asp Ser Ser
35 40 45

Ser Gln Ser Trp Asn Val Pro Val Leu Ser Ser Tyr Glu Val Gly Glu
50 55 60

Arg Leu Lys Leu Ala Arg Gly Gly Gln Gln Phe Leu Ala Met Tyr Ser
65 70 75 80

Ser Val Val Asp Gly Ile Thr Thr Asp Pro Ala Ala Met Val Leu Pro
85 90 95

Leu Asp Asp His Met Val His Arg Gly His Gly Val Phe Asp Thr Ala
100 105 110

Leu Ile Ile Asn Gly Tyr Leu Tyr Glu Leu Asp Gln His Leu Asp Arg
115 120 125

Ile Leu Arg Ser Ala Ser Met Ala Lys Ile Pro Leu Pro Phe Asp Arg
130 135 140

Glu Thr Ile Lys Arg Ile Leu Ile Gln Thr Val Ser Val Ser Gly Cys
145 150 155 160

Arg Asp Gly Ser Leu Arg Tyr Trp Leu Ser Ala Gly Pro Gly Asp Phe
165 170 175

```
Leu Leu Ser Pro Ser Gln Cys Leu Lys Pro Thr Leu Tyr Ala Ile Val
            180                 185                 190

Ile Lys Thr Asn Phe Ala Ile Asn Pro Ile Gly Val Lys Val Val Thr
        195                 200                 205

Ser Ser Ile Pro Ile Lys Pro Pro Glu Phe Ala Thr Val Lys Ser Val
    210                 215                 220

Asn Tyr Leu Pro Asn Val Leu Ser Gln Met Glu Ala Glu Ala Lys Gly
225                 230                 235                 240

Ala Tyr Ala Gly Ile Trp Val Cys Lys Asp Gly Phe Ile Ala Glu Gly
                245                 250                 255

Pro Asn Met Asn Val Ala Phe Val Val Asn Gly Gly Lys Glu Leu Val
            260                 265                 270

Met Pro Arg Phe Asp Asn Val Leu Ser Gly Cys Thr Ala Lys Arg Thr
        275                 280                 285

Leu Thr Leu Ala Glu Gln Leu Val Ser Lys Gly Ile Leu Lys Thr Val
    290                 295                 300

Lys Val Met Asp Val Thr Val Glu Asp Gly Lys Lys Ala Asp Glu Met
305                 310                 315                 320

Met Leu Ile Gly Ser Gly Ile Pro Ile Arg Pro Val Ile Gln Trp Asp
                325                 330                 335

Glu Glu Phe Ile Gly Glu Gly Lys Glu Gly Pro Ile Ala Lys Ala Leu
            340                 345                 350

Leu Asp Leu Leu Leu Glu Asp Met Arg Ser Gly Pro Pro Ser Val Arg
        355                 360                 365

Val Leu Val Pro Tyr
    370
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<210> 19
<211> 1188
<212> DNA
<213> Lycopersicon esculentum

<400> 19

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ccaactctca caaaacccat ctcagaaact tcatttttttc taccaaaatt aatcaatttg    120

gaattttcaa gatcaaagat cagaccttta accagatcca atgttttcaa gaactcaaat    180

ttttcctctg atggacaatg ttgtccaacc tttgatgttc cacttctttc ttgctcagag    240

gttattgaga ggatgagaac aagtcgagaa ggttacaaga ccaagcagct ttatttggca    300

atgtactcga gcgtttttgg tggaatcaca accgatacag ctgccatggt gatacctatg    360

gatgatcaca tggttcatag agggcacggt gtctttgata ctgctgccat tatggatgga    420
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tacctttatg agttggacca acaccttgat cgtttcctgg gatccgcaac catggccaaa    480
atacaaattc ctttcgatag ggaaagcata agacagattc tcatccgtac agtaagtgtt    540
tccaagtgca gaaaaggttc tttaagatac tggttttcgg caggacctgg tgattttcaa    600
ctatcttcat caggctgtca tcaagcaact ctttatgcca ttgtaattaa agatcaatca    660
cctcctgatc acaacggcat taaagttgta acgtcatcca ttccgataaa acccctacag    720
tttgctgtca tgaaaagtgt taattatctt ccgaatgcac tttccaagat ggaagcagaa    780
gaaaatgatg catatgcagc aatttggtta gatggcgatg gctttgttgc agaaggaccg    840
aacatgaatg tggcttttgt tacaaaggaa aaggaccttc tgatgccttg ttttgataaa    900
attctcagtg gctgtacagc taaaagagtc ctggttcttg cagaaaatct agtaaaggaa    960
ggtaaacttc gaggcattag agtagaaaat gtgtctgtag aggacgcgaa aagagcagat   1020
gagatgatgc taattggtag tgggattctt gtacgctcgg tggtgcagtg ggatgaagaa   1080
atcatcggta atggtagaga aggtcctgtg acacaagctc tgctaaatct tatcttggaa   1140
gatatgaagt cagggcctcc cacggtgcga gttcccgttc cctattga                1188
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<210> 20
<211> 395
<212> PRT
<213> Lycopersicon esculentum

<400> 20

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Met Pro Ile Phe Phe Thr Gln Lys Phe Val Lys Leu Ala Lys Asp Thr
1               5                   10                  15

Met Ala Ser Leu Pro Thr Leu Thr Lys Pro Ile Ser Glu Thr Ser Phe
            20                  25                  30

Phe Leu Pro Lys Leu Ile Asn Leu Glu Phe Ser Arg Ser Lys Ile Arg
        35                  40                  45

Pro Leu Thr Arg Ser Asn Val Phe Lys Asn Ser Asn Phe Ser Ser Asp
    50                  55                  60

Gly Gln Cys Cys Pro Thr Phe Asp Val Pro Leu Leu Ser Cys Ser Glu
65                  70                  75                  80

Val Ile Glu Arg Met Arg Thr Ser Arg Glu Gly Tyr Lys Thr Lys Gln
                85                  90                  95

Leu Tyr Leu Ala Met Tyr Ser Ser Val Phe Gly Gly Ile Thr Thr Asp
            100                 105                 110

Thr Ala Ala Met Val Ile Pro Met Asp Asp His Met Val His Arg Gly
        115                 120                 125

His Gly Val Phe Asp Thr Ala Ala Ile Met Asp Gly Tyr Leu Tyr Glu
    130                 135                 140
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Leu Asp Gln His Leu Asp Arg Phe Leu Gly Ser Ala Thr Met Ala Lys
145                 150                 155                 160

Ile Gln Ile Pro Phe Asp Arg Glu Ser Ile Arg Gln Ile Leu Ile Arg
                165                 170                 175

Thr Val Ser Val Ser Lys Cys Arg Lys Gly Ser Leu Arg Tyr Trp Phe
            180                 185                 190

Ser Ala Gly Pro Gly Asp Phe Gln Leu Ser Ser Ser Gly Cys His Gln
        195                 200                 205

Ala Thr Leu Tyr Ala Ile Val Ile Lys Asp Gln Ser Pro Pro Asp His
    210                 215                 220

Asn Gly Ile Lys Val Val Thr Ser Ser Ile Pro Ile Lys Pro Leu Gln
225                 230                 235                 240

Phe Ala Val Met Lys Ser Val Asn Tyr Leu Pro Asn Ala Leu Ser Lys
                245                 250                 255

Met Glu Ala Glu Glu Asn Asp Ala Tyr Ala Ala Ile Trp Leu Asp Gly
            260                 265                 270

Asp Gly Phe Val Ala Glu Gly Pro Asn Met Asn Val Ala Phe Val Thr
        275                 280                 285

Lys Glu Lys Asp Leu Leu Met Pro Cys Phe Asp Lys Ile Leu Ser Gly
    290                 295                 300

Cys Thr Ala Lys Arg Val Leu Val Leu Ala Glu Asn Leu Val Lys Glu
305                 310                 315                 320

Gly Lys Leu Arg Gly Ile Arg Val Glu Asn Val Ser Val Glu Asp Ala
                325                 330                 335

Lys Arg Ala Asp Glu Met Met Leu Ile Gly Ser Gly Ile Leu Val Arg
            340                 345                 350

Ser Val Val Gln Trp Asp Glu Glu Ile Ile Gly Asn Gly Arg Glu Gly
        355                 360                 365

Pro Val Thr Gln Ala Leu Leu Asn Leu Ile Leu Glu Asp Met Lys Ser
    370                 375                 380

Gly Pro Pro Thr Val Arg Val Pro Val Pro Tyr
385                 390                 395


<210>  21
<211>  1170
<212>  DNA
<213>  Oryza sativa

<400>  21
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agggcggcgg tggccaccgc agccacgagc tccaatcgga ccgctgcacc agccgagacc 180

attgtcactg gaaatgatgt ccctctcttg tcttttgctg aggttgcaga aaggcttgat 240

gaattccatg catctggaac cagaaatcaa aattacatgg ccatgtactc tagtattttt 300

ggtggaatta ccacaaatcc ttctgcaatg gtgataccaa tcgatgatca catggtccac 360

agaggacatg gtgtttttga tactgcagct attatgaatg ggcacctcta tgagttagag 420

cagcatcttg accgcttcct gaagtctgca tcaatggcca aaatcacgct gccttttgat 480

cggtcaacaa ttcggagcat acttattcaa actgtgagtg catcaaaatg cacccaagga 540

tcactcaggt actggctatc tgttggacca ggagacttcc agctatcttc agctggttgt 600

gcaaactcag ccctgtatgc tattgtcatt gaaagtccat cgttaccagt accagcagga 660

tgcaaggtga tcacatcatc gataccgata aaatctcaac agtttgcggt catgaaaagt 720

gtaaactacc tgccaaatgc actcactaaa gtggaaggcg aagaaaatgg tggattcacc 780

ggcatatggt tggatgatga gggtttcgta gcagagggtt ccaacatgaa tgttggcttc 840

gtgacacaaa gcaaggagct cctcatgccc cgtttcgaca agatccttag cgggtgcacg 900

gcaaaacggg ttctgaccct tgccaagcag ctagtggcag atggaaggct cagcgggatc 960

agttcaagga atgtgagtgt ccaggaaggg aaggcggctg atgagatgat gctcattggt 1020

agtggtattc ttgtcaaacc tgttgttcag tgggatgatc agataattgg ctcaggcaaa 1080

gaaggcccaa ttgctcagat gcttttcaac ctcattcttg aggacatgag atccggtcca 1140

ccttcagtcc gcatccctgt ctcctattga 1170

<210> 22
<211> 389
<212> PRT
<213> Oryza sativa

<400> 22

Met Met Ala Ser Leu Ser Thr Pro Pro Ala Thr Ala Gly Val Ser Pro
1 5 10 15

Ser Pro Arg Pro Ser Leu Leu Ala Tyr Lys Lys Ala Ala Gly Leu Thr
20 25 30

Pro Ser Pro Trp Cys Gly Trp Arg Arg Ala Ala Val Ala Thr Ala Ala
35 40 45

Thr Ser Ser Asn Arg Thr Ala Ala Pro Ala Glu Thr Ile Val Thr Gly
50 55 60

Asn Asp Val Pro Leu Leu Ser Phe Ala Glu Val Ala Glu Arg Leu Asp
65 70 75 80

Glu Phe His Ala Ser Gly Thr Arg Asn Gln Asn Tyr Met Ala Met Tyr
85 90 95

```
Ser Ser Ile Phe Gly Gly Ile Thr Thr Asn Pro Ser Ala Met Val Ile
            100                 105                 110

Pro Ile Asp Asp His Met Val His Arg Gly His Gly Val Phe Asp Thr
        115                 120                 125

Ala Ala Ile Met Asn Gly His Leu Tyr Glu Leu Glu Gln His Leu Asp
    130                 135                 140

Arg Phe Leu Lys Ser Ala Ser Met Ala Lys Ile Thr Leu Pro Phe Asp
145                 150                 155                 160

Arg Ser Thr Ile Arg Ser Ile Leu Ile Gln Thr Val Ser Ala Ser Lys
                165                 170                 175

Cys Thr Gln Gly Ser Leu Arg Tyr Trp Leu Ser Val Gly Pro Gly Asp
            180                 185                 190

Phe Gln Leu Ser Ser Ala Gly Cys Ala Asn Ser Ala Leu Tyr Ala Ile
        195                 200                 205

Val Ile Glu Ser Pro Ser Leu Pro Val Pro Ala Gly Cys Lys Val Ile
    210                 215                 220

Thr Ser Ser Ile Pro Ile Lys Ser Gln Gln Phe Ala Val Met Lys Ser
225                 230                 235                 240

Val Asn Tyr Leu Pro Asn Ala Leu Thr Lys Val Glu Gly Glu Glu Asn
                245                 250                 255

Gly Gly Phe Thr Gly Ile Trp Leu Asp Asp Glu Gly Phe Val Ala Glu
            260                 265                 270

Gly Ser Asn Met Asn Val Gly Phe Val Thr Gln Ser Lys Glu Leu Leu
        275                 280                 285

Met Pro Arg Phe Asp Lys Ile Leu Ser Gly Cys Thr Ala Lys Arg Val
    290                 295                 300

Leu Thr Leu Ala Lys Gln Leu Val Ala Asp Gly Arg Leu Ser Gly Ile
305                 310                 315                 320

Ser Ser Arg Asn Val Ser Val Gln Glu Gly Lys Ala Ala Asp Glu Met
                325                 330                 335

Met Leu Ile Gly Ser Gly Ile Leu Val Lys Pro Val Val Gln Trp Asp
            340                 345                 350

Asp Gln Ile Ile Gly Ser Gly Lys Glu Gly Pro Ile Ala Gln Met Leu
        355                 360                 365

Phe Asn Leu Ile Leu Glu Asp Met Arg Ser Gly Pro Pro Ser Val Arg
    370                 375                 380
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Ile Pro Val Ser Tyr
385

<210> 23
<211> 981
<212> DNA
<213> Oryza sativa

<400> 23
ggcgcctgga gggaggagag gggagagatg gtgagagagg aggaagaaga ggaggggtga 60

caatgatatg tgggccatgt ggcccccacc atttttaat tcattctttt gttgaaactg 120

acatgtgggt cccatgagaa ttattatttt tcggatcgaa ttgccacgta agcgctacgt 180

caatgctacg tcagatgaag accgagtcaa attagccacg taagcgccac gtcagccaaa 240

accaccatcc aaaccgccga gggacctcat ctgcactggt tttgatagtt gagggacccg 300

ttgtatctgg tttttcgatt gaaggacgaa aatcaaattt gttgacaagt taagggacct 360

taaatgaact tattccattt caaaatattc tgtgagccat atatccgtgg gcttccaatc 420

ctcctcaaat taaagggcct ttttaaaata gataattgcc ttctttcagt cacccataaa 480

agtacaaaac tactaccaac aagcaacatg cgcagttaca cacattttct gcacatttcc 540

accacgtcac aaagagctaa gagttatccc taggacaatc tcattagtgt agatacatcc 600

attaatcttt tatcagaggc aaacgtaaag ccgctcttta tgacaaaaat aggtgacaca 660

aaagtgttat ctgccacata cataacttca gaaattaccc aacaccaaga gaaaaataaa 720

aaaaaatctt tttgcaagct ccaaatcttg gaaacctttt tcactctttg cagcattgta 780

ctcttgctct ttttccaacc gatccatgtc accctcaagc ttctacttga tctacacgaa 840

gctcaccgtg cacacaacca tggccacaaa aaccctataa aaccccatcc gatcgccatc 900

atctcatcat cagttcatca ccaacaaaca aaagaggaaa aaaaacatat acacttctag 960

tgattgtctg attgatcatc a 981

<210> 24
<211> 1291
<212> DNA
<213> Oryza sativa

<400> 24
caatcgaaca gacagttgaa gagatatgga ttttctaaga ttaattgatt ctctgtctaa 60

agaaaaaaag tattattgaa ttaaatggaa aaagaaaaag gaaaaagggg atggcttctg 120

ccttttttggg ctgaaggcgg cgtgtggccc agcgtgctgc gtgggcacag ccgagcgaac 180

acacgacgga gcagctacga cgaacggggg accgagtgga ccggacgagg atgtggccta 240

ggacgagtgc acaaggctag tggactcggt cccccgcgcg gtatcccgag tgggtccact 300

cgtctgcaaa cacgattcac atagagcggg agcacgcggg gagccgtcct atgtgcacgg 360

caagcaaatc cgtgcgcctg ggtggatttg agtgacacgg gcccacgtgt agcctcacag 420

ctctccgtgg tcagatgtgt aaaattatca taatatgtgt ttttcacata gttaaataat 480

atatataggc aaggtatatg ggtcaataag cagtaaaaag gcttatgaca tggtacaatt 540

acttacacca atatgcctta ctgtctgata tattttacat gaacacacag ttacaagtac 600

gttcatttaa aaatacaagg tacttatcaa ttggagtgta tcaagttaat gaccacaaaa 660

cctaccaatt ttgctatttt gaaggaacac ttaaaaaaat caataggcaa gttatatagt 720

caataaactg caagaaggct tatgacatgg aaaaattaca tacaccaata tgctttattg 780

tccggtatat tttacaagac aacaaagtta taagtatgtc atttaaaaat acaagttact 840

tatcaattgt caagtaaatg aaaacaaacc tacaaatttg ttattttgaa ggaacaccta 900

aattatcaaa tatagcttgc tacgcaaaaa tgacaacatg cttacaagtt attatcatct 960

taaagttaga ctcatcttct caagcataag agctttatgg tgcaaaaaca aatataatga 1020

caaggcaaag atacatatta agagtatgga tagacatttc tttaacaaac tccatttgta 1080

ttactccaaa agcaccagaa gtttgtcatg gctgagtcat gaaatgtata gttcaatctt 1140

gcaaagttgc ctttccttt gtactgtttt aacactacaa gccatatatt gtctgtacgt 1200

gcaacaaact atatcaccat gtatcccaag atgctttttt attgctatat aaactagctt 1260

ggtctgtctt tgaactcaca tcaattagct t 1291

<210> 25
<211> 38
<212> DNA
<213> Artificial Sequence

<220>
<223> Probe

<400> 25
aaaaagcagg ctctaccatg ggcgcattag atgaggga 38

<210> 26
<211> 40
<212> DNA
<213> Artificial Sequence

<220>
<223> Probe

<400> 26
agaaagctgg gtcttagttc tttgaactag tgtttcgctg 40

<210> 27
<211> 35
<212> DNA
<213> Artificial Sequence

<220>
<223> Probe

<400> 27
aaaaagcagg ctctaaacga gttatgaaca tgaat 35

<210> 28
<211> 37
<212> DNA
<213> Artificial Sequence

<220>
<223> Probe

<400> 28

agaaagctgg gtaaaactat tgtctcctct gatcact 37

<210> 29
<211> 32
<212> DNA
<213> Artificial Sequence

<220>
<223> Probe

<400> 29
aaggcgcgcc acactctcgt ctactccaag aa 32

<210> 30
<211> 32
<212> DNA
<213> Artificial sequence

<220>
<223> Probe

<400> 30
caggcgcgcc gatctggatt ttagtactgg at 32

<210> 31
<211> 30
<212> DNA
<213> Artificial Sequence

<220>
<223> Probe

<400> 31
ataaccatgg gcgcattaga tgagggatgt 30

<210> 32
<211> 33
<212> DNA
<213> Artificial Sequence

<220>
<223> Probe

<400> 32
ataactagta aatggagagc ttgactctgt ctt 33

<210> 33
<211> 20
<212> DNA
<213> Artificial Sequence

<220>
<223> Probe

<400> 33
cctccggtgc catgaacaag 20

<210> 34
<211> 20
<212> DNA
<213> Artificial sequence

<220>
<223> Probe

<400> 34
acagccctga acacctcctg 20

<210> 35
<211> 22
<212> DNA
<213> Artificial sequence

<220>
<223> Probe

<220>
<221> misc_feature
<222> (1)..(1)
<223> n = HEX

<220>
<221> misc_feature
<222> (22)..(22)
<223> n = BHQ2

<400> 35
nctcctccgc cgacgccgca gn 22

<210> 36
<211> 20
<212> DNA
<213> Artificial Sequence

<220>
<223> Probe

<400> 36
agggtgtcac gttgcaagac 20

<210> 37
<211> 20
<212> DNA
<213> Artificial sequence

<220>
<223> Probe

<400> 37
cgctcgtctg gctaagatcg 20

<210> 38
<211> 26
<212> DNA
<213> Artificial sequence

<220>
<223> Probe

<220>
<221> misc_feature
<222> (1)..(1)
<223> n = FAM

<220>
<221> misc_feature
<222> (26)..(26)
<223> n = BHQ1

<400> 38

ntgcctgaaa ccgaactgcc cgctgn 26

<210> 39
<211> 774
<212> DNA
<213> Homo sapiens

<400> 39
atggctcagc ggatgacaac acagctgctg ctccttctag tgtgggtggc tgtagtaggg 60

gaggctcaga caaggattgc atgggccagg actgagcttc tcaatgtctg catgaacgcc 120

aagcaccaca aggaaaagcc aggccccgag gacaagttgc atgagcagtg tcgaccctgg 180

aggaagaatg cctgctgttc taccaacacc agccaggaag cccataagga tgtttcctac 240

ctatatagat tcaactggaa ccactgtgga gagatggcac ctgcctgcaa acggcatttc 300

atccaggaca cctgcctcta cgagtgctcc cccaacttgg ggccctggat ccagcaggtg 360

gatcagagct ggcgcaaaga gcgggtactg aacgtgcccc tgtgcaaaga ggactgtgag 420

caatggtggg aagattgtcg cacctcctac acctgcaaga gcaactggca caagggctgg 480

aactggactt cagggtttaa caagtgcgca gtgggagctg cctgccaacc tttccatttc 540

tacttcccca cacccactgt tctgtgcaat gaaatctgga ctcactccta caaggtcagc 600

aactacagcc gagggagtgg ccgctgcatc cagatgtggt tcgacccagc ccagggcaac 660

cccaatgagg aggtggcgag gttctatgct gcagccatga gtggggctgg gccctgggca 720

gcctggcctt tcctgcttag cctggcccta atgctgctgt ggctgctcag ctag 774

<210> 40
<211> 257
<212> PRT
<213> Homo sapiens

<400> 40

Met Ala Gln Arg Met Thr Thr Gln Leu Leu Leu Leu Leu Val Trp Val
1 5 10 15

Ala Val Val Gly Glu Ala Gln Thr Arg Ile Ala Trp Ala Arg Thr Glu
20 25 30

Leu Leu Asn Val Cys Met Asn Ala Lys His His Lys Glu Lys Pro Gly
35 40 45

Pro Glu Asp Lys Leu His Glu Gln Cys Arg Pro Trp Arg Lys Asn Ala
50 55 60

Cys Cys Ser Thr Asn Thr Ser Gln Glu Ala His Lys Asp Val Ser Tyr
65 70 75 80

Leu Tyr Arg Phe Asn Trp Asn His Cys Gly Glu Met Ala Pro Ala Cys
85 90 95

Lys Arg His Phe Ile Gln Asp Thr Cys Leu Tyr Glu Cys Ser Pro Asn
100 105 110

```
Leu Gly Pro Trp Ile Gln Gln Val Asp Gln Ser Trp Arg Lys Glu Arg
        115                 120                 125

Val Leu Asn Val Pro Leu Cys Lys Glu Asp Cys Glu Gln Trp Trp Glu
    130                 135                 140

Asp Cys Arg Thr Ser Tyr Thr Cys Lys Ser Asn Trp His Lys Gly Trp
145                 150                 155                 160

Asn Trp Thr Ser Gly Phe Asn Lys Cys Ala Val Gly Ala Ala Cys Gln
                165                 170                 175

Pro Phe His Phe Tyr Phe Pro Thr Pro Thr Val Leu Cys Asn Glu Ile
            180                 185                 190

Trp Thr His Ser Tyr Lys Val Ser Asn Tyr Ser Arg Gly Ser Gly Arg
        195                 200                 205

Cys Ile Gln Met Trp Phe Asp Pro Ala Gln Gly Asn Pro Asn Glu Glu
    210                 215                 220

Val Ala Arg Phe Tyr Ala Ala Ala Met Ser Gly Ala Gly Pro Trp Ala
225                 230                 235                 240

Ala Trp Pro Phe Leu Leu Ser Leu Ala Leu Met Leu Leu Trp Leu Leu
                245                 250                 255

Ser
```

<210> 41
<211> 1548
<212> DNA
<213> Pisum sativum

<400> 41

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atgagtatac ttaagtgcct gggcgtgcgc gggaatcagc tctgtgctgc cagaaactat     60

cttaaagtgc tgggtttttc ctcttttcac acagctccaa actcctctat tgaaattcaa    120

actcaagatg aagaagtagt gattgctttg ggaagtaatg taggtgatag actacataac    180

ttcaaggaag ccttgaaatt gatgaggaag tcaggcatac acatcacaag acatgcaagt    240

ctgtatgaga cagcaccagc gtatgttact gaccaacctc gcttcctcaa ctctgcagta    300

agagcggata cgaaactcgg gccacatgaa ttattggctg cactcaaacg aatcgagaag    360

gatatgggcc gtactgatgg tataaggtat ggtccaaggc caattgactt agacattttg    420

ttctatggta aatttaaagt cagatctgat attctcacag tacctcacga aagaatttgg    480

gaacgaccgt ttgtcatggc ccctttgatg gatttgctgg gaacagctat tgacagtgat    540

acagttgcta gctggcattc attttcaggc cattctggtg gactaaatgc attatgggaa    600

aagttaggtg gagaatccct tattggagag gaaggtatgt atagggtaat gcctgttgca    660

aatggcttac ttgattggtc gcgaagaaca ttggtcatgg ggattcttaa tttgactcca    720

gatagtttca gtgatggagg gaattttcag tctgtgaagt ctgctgtttc gcaggcacgg    780
```

ttaatgatat cagagggtgc tgatataatt gatattggtg ctcagtctac tcggccaatg 840

gcatcaagga tctctgccga agaagaatta ggtagattaa tccctgtcct ggaagctgta 900

atgtcaatac ctgaggtaga aggaaaactc atatctgtgg atactttcta ctctgaagtt 960

gcattagaag cagtacgtaa aggggctcat attataaatg atgtatctgc cggaaagtta 1020

gatgcaagta tgtttaaggt catggcagag cttgatgttc cttatgtcgc aatgcacatg 1080

aggggtgacc cgagtacaat gcaggatagt gaaaacctga aatatgataa tgtttgcaag 1140

gatatatcgt cggaattata ctcgcgggtt agagaggcag aaatatcggg aatcccggca 1200

tggaggatta ttatggaccc tggaattgga ttctcaaaga aaaccgaaga caatttagcg 1260

gcactaacgg gaatacctga tattagagaa gagatttcaa aaagaagttt ggccatctct 1320

catgctccta tactaattgg accgtcaaga aagcgatttt taggtgaaat ttgctctcgc 1380

ccttctgcgg ttgatagaga tcccgctacc attgcttctg tcaccgcagg tgtgttgtgt 1440

ggcgcaaata ttgttcgagt gcataatgtt aaagataatc tagatgcggt gaagctttgt 1500

gatgcaattc tgaaacaaaa gagttctccc ataaaattta aacagtga 1548

<210> 42
<211> 515
<212> PRT
<213> Pisum sativum

<400> 42

Met Ser Ile Leu Lys Cys Leu Gly Val Arg Gly Asn Gln Leu Cys Ala
1 5 10 15

Ala Arg Asn Tyr Leu Lys Val Leu Gly Phe Ser Ser Phe His Thr Ala
20 25 30

Pro Asn Ser Ser Ile Glu Ile Gln Thr Gln Asp Glu Glu Val Val Ile
35 40 45

Ala Leu Gly Ser Asn Val Gly Asp Arg Leu His Asn Phe Lys Glu Ala
50 55 60

Leu Lys Leu Met Arg Lys Ser Gly Ile His Ile Thr Arg His Ala Ser
65 70 75 80

Leu Tyr Glu Thr Ala Pro Ala Tyr Val Thr Asp Gln Pro Arg Phe Leu
85 90 95

Asn Ser Ala Val Arg Ala Asp Thr Lys Leu Gly Pro His Glu Leu Leu
100 105 110

Ala Ala Leu Lys Arg Ile Glu Lys Asp Met Gly Arg Thr Asp Gly Ile
115 120 125

Arg Tyr Gly Pro Arg Pro Ile Asp Leu Asp Ile Leu Phe Tyr Gly Lys
130 135 140

```
Phe Lys Val Arg Ser Asp Ile Leu Thr Val Pro His Glu Arg Ile Trp
145                 150                 155                 160

Glu Arg Pro Phe Val Met Ala Pro Leu Met Asp Leu Leu Gly Thr Ala
                165                 170                 175

Ile Asp Ser Asp Thr Val Ala Ser Trp His Ser Phe Ser Gly His Ser
            180                 185                 190

Gly Gly Leu Asn Ala Leu Trp Glu Lys Leu Gly Gly Glu Ser Leu Ile
        195                 200                 205

Gly Glu Glu Gly Met Tyr Arg Val Met Pro Val Ala Asn Gly Leu Leu
    210                 215                 220

Asp Trp Ser Arg Arg Thr Leu Val Met Gly Ile Leu Asn Leu Thr Pro
225                 230                 235                 240

Asp Ser Phe Ser Asp Gly Gly Asn Phe Gln Ser Val Lys Ser Ala Val
                245                 250                 255

Ser Gln Ala Arg Leu Met Ile Ser Glu Gly Ala Asp Ile Ile Asp Ile
            260                 265                 270

Gly Ala Gln Ser Thr Arg Pro Met Ala Ser Arg Ile Ser Ala Glu Glu
        275                 280                 285

Glu Leu Gly Arg Leu Ile Pro Val Leu Glu Ala Val Met Ser Ile Pro
    290                 295                 300

Glu Val Glu Gly Lys Leu Ile Ser Val Asp Thr Phe Tyr Ser Glu Val
305                 310                 315                 320

Ala Leu Glu Ala Val Arg Lys Gly Ala His Ile Ile Asn Asp Val Ser
                325                 330                 335

Ala Gly Lys Leu Asp Ala Ser Met Phe Lys Val Met Ala Glu Leu Asp
            340                 345                 350

Val Pro Tyr Val Ala Met His Met Arg Gly Asp Pro Ser Thr Met Gln
        355                 360                 365

Asp Ser Glu Asn Leu Lys Tyr Asp Asn Val Cys Lys Asp Ile Ser Ser
    370                 375                 380

Glu Leu Tyr Ser Arg Val Arg Glu Ala Glu Ile Ser Gly Ile Pro Ala
385                 390                 395                 400

Trp Arg Ile Ile Met Asp Pro Gly Ile Gly Phe Ser Lys Lys Thr Glu
                405                 410                 415

Asp Asn Leu Ala Ala Leu Thr Gly Ile Pro Asp Ile Arg Glu Glu Ile
            420                 425                 430
```

```
Ser Lys Arg Ser Leu Ala Ile Ser His Ala Pro Ile Leu Ile Gly Pro
        435                 440                 445

Ser Arg Lys Arg Phe Leu Gly Glu Ile Cys Ser Arg Pro Ser Ala Val
    450                 455                 460

Asp Arg Asp Pro Ala Thr Ile Ala Ser Val Thr Ala Gly Val Leu Cys
465                 470                 475                 480

Gly Ala Asn Ile Val Arg Val His Asn Val Lys Asp Asn Leu Asp Ala
                485                 490                 495

Val Lys Leu Cys Asp Ala Ile Leu Lys Gln Lys Ser Ser Pro Ile Lys
            500                 505                 510

Phe Lys Gln
        515
```

<210> 43
<211> 1593
<212> DNA
<213> Arabidopsis thaliana

<400> 43

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atgaggacac tctggaatca ctttagtacc aattcctata tcaaaatttc tccgagaatg     60

agaagaattt ctgcagcaaa tttgatctca aatcgaaatc tttcaaccat ttcttctact    120

gaagatcccg agctcagaga ttttgtggga tttttagaat ctctcaaaaa ctatgagaaa    180

tcaggtgtac caaaaggagc tggaactgat tctgatgatg gattcgatct gggtcgaatg    240

aaacgtctca tgcttcgcct ccgtaatcct cattacaaat acaaggttgt tcatgttgct    300

ggaactaagg gaaaaggatc aacttctgct tttctctcta atatcttacg agctggagga    360

tattctgttg gttgttattc tagcccacat attctgagta tcaaagaacg gatttcttgt    420

aatggagaac ctgtctctgc ttccactctt aatgatcttt tctattcagt caaaccgatt    480

cttgaacagt ctattcaaga ggaaaatggt tctttgagtc attttgagat tctcactggg    540

atagccttct ctttatttga aaaggaaaat gtcgacattg cggttataga ggctgggcta    600

ggaggagctc gagacgctac aaatgtcatt gaaagttcaa atcttgctgc atcggtcata    660

acaacgatag gtgaggaaca catggcagca cttgggggtt ccttggaaag tatagcagag    720

gctaaatctg gaattattaa acacggtcgc ccagtggttt taggtggacc gtttcttcct    780

catatcgagg gcattctccg ttctaaagca gcttcagtgt cgtcatcggt tattttggca    840

tctaatattg gatctagttc ttcaatcaaa ggcatcatta acaaaaatgg gatcgggctt    900

tgccagtcct gtgacatcgt gatacagaat gagaaagatg atcaaccaat tgttgagctt    960

agtgatgtaa acctacgtat gcttggacat caccagctcc aaaatgctgt tactgccaca   1020

tgtgtgtctc tttgtcttcg cgatcaagga tgtgggagag tgacagatga agcaattagg   1080

attggtttag agaacactcg tttacttggg agaagtcagt ttctgacacc aaaaaaagca   1140

gagactttac tattacccgg agcaacagtg cttcttgatg gagctcacac caaagagtca   1200
```

gcgcgagctc tcaaggagat gataaagaag gattttccag agaaaagatt ggtatttgtg 1260

gttgccatgg ctagtgacaa agatcatgtg tcctttgcaa aagaacttct ctcaggtcta 1320

aaaccagaag cagtgattct aacagaagct gacatcggtg gaggtaagat tagatcaacg 1380

gagtcttcgg cgttgaaaga atcatggata aaagctgctg atgaattggg gtcaaggtct 1440

atggaagctt cagaaaacaa aactgtgttg ggttccttaa agcttgccta caagatactc 1500

agcgatgaca caacaagtag tgactcagga atggttatag tcacgggttc gcttcacatt 1560

gtatcttcag tcttagcttc tcttcaacat taa 1593

<210> 44
<211> 530
<212> PRT
<213> Arabidopsis thaliana

<400> 44

Met Arg Thr Leu Trp Asn His Phe Ser Thr Asn Ser Tyr Ile Lys Ile
1 5 10 15

Ser Pro Arg Met Arg Arg Ile Ser Ala Ala Asn Leu Ile Ser Asn Arg
20 25 30

Asn Leu Ser Thr Ile Ser Ser Thr Glu Asp Pro Glu Leu Arg Asp Phe
35 40 45

Val Gly Phe Leu Glu Ser Leu Lys Asn Tyr Glu Lys Ser Gly Val Pro
50 55 60

Lys Gly Ala Gly Thr Asp Ser Asp Asp Gly Phe Asp Leu Gly Arg Met
65 70 75 80

Lys Arg Leu Met Leu Arg Leu Arg Asn Pro His Tyr Lys Tyr Lys Val
85 90 95

Val His Val Ala Gly Thr Lys Gly Lys Gly Ser Thr Ser Ala Phe Leu
100 105 110

Ser Asn Ile Leu Arg Ala Gly Gly Tyr Ser Val Gly Cys Tyr Ser Ser
115 120 125

Pro His Ile Leu Ser Ile Lys Glu Arg Ile Ser Cys Asn Gly Glu Pro
130 135 140

Val Ser Ala Ser Thr Leu Asn Asp Leu Phe Tyr Ser Val Lys Pro Ile
145 150 155 160

Leu Glu Gln Ser Ile Gln Glu Glu Asn Gly Ser Leu Ser His Phe Glu
165 170 175

Ile Leu Thr Gly Ile Ala Phe Ser Leu Phe Glu Lys Glu Asn Val Asp
180 185 190

Ile Ala Val Ile Glu Ala Gly Leu Gly Gly Ala Arg Asp Ala Thr Asn

```
        195                 200                 205

Val Ile Glu Ser Ser Asn Leu Ala Ala Ser Val Ile Thr Thr Ile Gly
    210                 215                 220

Glu Glu His Met Ala Ala Leu Gly Gly Ser Leu Glu Ser Ile Ala Glu
225                 230                 235                 240

Ala Lys Ser Gly Ile Ile Lys His Gly Arg Pro Val Val Leu Gly Gly
                245                 250                 255

Pro Phe Leu Pro His Ile Glu Gly Ile Leu Arg Ser Lys Ala Ala Ser
            260                 265                 270

Val Ser Ser Ser Val Ile Leu Ala Ser Asn Ile Gly Ser Ser Ser Ser
        275                 280                 285

Ile Lys Gly Ile Ile Asn Lys Asn Gly Ile Gly Leu Cys Gln Ser Cys
    290                 295                 300

Asp Ile Val Ile Gln Asn Glu Lys Asp Asp Gln Pro Ile Val Glu Leu
305                 310                 315                 320

Ser Asp Val Asn Leu Arg Met Leu Gly His His Gln Leu Gln Asn Ala
                325                 330                 335

Val Thr Ala Thr Cys Val Ser Leu Cys Leu Arg Asp Gln Gly Cys Gly
            340                 345                 350

Arg Val Thr Asp Glu Ala Ile Arg Ile Gly Leu Glu Asn Thr Arg Leu
        355                 360                 365

Leu Gly Arg Ser Gln Phe Leu Thr Pro Lys Lys Ala Glu Thr Leu Leu
    370                 375                 380

Leu Pro Gly Ala Thr Val Leu Leu Asp Gly Ala His Thr Lys Glu Ser
385                 390                 395                 400

Ala Arg Ala Leu Lys Glu Met Ile Lys Lys Asp Phe Pro Glu Lys Arg
                405                 410                 415

Leu Val Phe Val Val Ala Met Ala Ser Asp Lys Asp His Val Ser Phe
            420                 425                 430

Ala Lys Glu Leu Leu Ser Gly Leu Lys Pro Glu Ala Val Ile Leu Thr
        435                 440                 445

Glu Ala Asp Ile Gly Gly Gly Lys Ile Arg Ser Thr Glu Ser Ser Ala
    450                 455                 460

Leu Lys Glu Ser Trp Ile Lys Ala Ala Asp Glu Leu Gly Ser Arg Ser
465                 470                 475                 480
```

```
Met Glu Ala Ser Glu Asn Lys Thr Val Leu Gly Ser Leu Lys Leu Ala
                485                 490                 495

Tyr Lys Ile Leu Ser Asp Asp Thr Thr Ser Ser Asp Ser Gly Met Val
            500                 505                 510

Ile Val Thr Gly Ser Leu His Ile Val Ser Ser Val Leu Ala Ser Leu
        515                 520                 525

Gln His
    530
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<210> 45
<211> 396
<212> DNA
<213> Arabidopsis thaliana

<400> 45

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atggagaaag acatggcaat gatgggagac aaactgatac tgagaggctt gaaattttat     60

ggtttccatg gagctattcc tgaagagaag acgcttggcc agatgtttat gcttgacatc    120

gatgcttgga tgtgtctcaa aaaggctggt ctatcagaca acttagctga ttctgtcagc    180

tatgtcgaca tttacaacgt ggcaaaggaa gttgtagaag ggtcatcaag aaaccttctg    240

gagagagttg caggacttat agcttccaaa actctggaaa tatcccctcg gataacagct    300

gttcgagtga agctatggaa gccaaatgtt gcgcttattc aaagcactat cgattattta    360

ggtgtcgaga ttttcagaga tcgcgcaact gaataa                              396
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<210> 46
<211> 131
<212> PRT
<213> Arabidopsis thaliana

<400> 46

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Met Glu Lys Asp Met Ala Met Met Gly Asp Lys Leu Ile Leu Arg Gly
1               5                   10                  15

Leu Lys Phe Tyr Gly Phe His Gly Ala Ile Pro Glu Glu Lys Thr Leu
            20                  25                  30

Gly Gln Met Phe Met Leu Asp Ile Asp Ala Trp Met Cys Leu Lys Lys
        35                  40                  45

Ala Gly Leu Ser Asp Asn Leu Ala Asp Ser Val Ser Tyr Val Asp Ile
    50                  55                  60

Tyr Asn Val Ala Lys Glu Val Val Glu Gly Ser Ser Arg Asn Leu Leu
65                  70                  75                  80

Glu Arg Val Ala Gly Leu Ile Ala Ser Lys Thr Leu Glu Ile Ser Pro
                85                  90                  95

Arg Ile Thr Ala Val Arg Val Lys Leu Trp Lys Pro Asn Val Ala Leu
            100                 105                 110
```

Ile Gln Ser Thr Ile Asp Tyr Leu Gly Val Glu Ile Phe Arg Asp Arg
115 120 125

Ala Thr Glu
130

<210> 47
<211> 1560
<212> DNA
<213> Arabidopsis thaliana

<400> 47
atggcaacaa ctactctcaa tgacagtgtc accactacac ttgcttcaga gcctcaaagg 60

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ccatggaatt tgccaacaga tctcaagttc tttaaagaca ttactttgac cacttcagat 180

tcctctaaga aaaatgctgt tgtgatgggt agaaagactt gggagtctat tcccattaag 240

tataggccgc tttcgggtcg gcttaacgtt gttctaactc gttctggtgg gtttgatata 300

gccaacactg agaatgttgt cacttgtagt agtgtagatt ctgctcttga tttgttagct 360

gcgccgccgt attgtttatc tattgagagg gtttttgtta taggaggtgg tgacatattg 420

agggaagcat tgaataggcc tagttgtgat gctatccatt taactgagat tgatacaagt 480

gttgactgtg atacgtttat acctgcgatt gatacttctg tttatcagcc ttggtcttca 540

tcgtttccag taactgaaaa tggacttcgg ttttgcttca cgacttttgt ccgtgtaaag 600

agttctgctg atgaatcttc tgatgaaagc aatgggtcac agtctcttca atttgatggg 660

aagaagtttt tgtttcttcc taagatggtt tttgatcagc atgaggagtt tctgtatttg 720

aatatggttg aagatattat ctctaatggc aatgtgaaga atgataggac cgggactggt 780

acattatcaa aatttggttg ccagatgaaa ttcaatttac gcagaagttt tccacttctg 840

acaacaaagc gagttttctg gagaggtgtt gttgaggaac ttctatggtt cataagcggt 900

tcaaccaatg caaaagtcct tcaggaaaaa ggtatccata tatgggatgg gaatgcgtca 960

agagagtatc tcgatggtat cggcctgaca gagagagagg aaggcgacct tggacctgta 1020

tacggatttc aatggcgaca ctttggtgct aagtacacag atatgcatgc tgattatact 1080

ggtcaaggat ttgatcaact tgtagatgta attgacaaaa tcaagaacaa tcctgatgat 1140

cggcgtatta taatgtcagc ttggaatcct tctgatctta agctgatggc acttcctcca 1200

tgccatatgt ttgcacaatt ttatgtggca gaaggggaac tctcatgtca aatgtatcag 1260

cgttcagcag atatgggcct tggtgtgccg tttaacattg cttcttactc tcttcttact 1320

tgcatgctgg ctcatgtgtg tgatcttgtt cctggtgatt ttatccatgt tcttggggat 1380

gctcatgtat acaaaactca cgtgaggcct ctgcaagagc aacttctgaa tcttccaaaa 1440

ccctttcctg taatgaagat aaacccggag aagaaacaaa tcgattcttt tgtggcttct 1500

gactttgacc tcacaggcta tgatcctcac aagaagatag aaatgaaaat ggcggtttag 1560

<210> 48
<211> 519
<212> PRT

<213> Arabidopsis thaliana

<400> 48

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Met Ala Thr Thr Thr Leu Asn Asp Ser Val Thr Thr Thr Leu Ala Ser
1               5                   10                  15

Glu Pro Gln Arg Thr Tyr Gln Val Val Val Ala Ala Thr Lys Glu Met
            20                  25                  30

Gly Ile Gly Lys Asp Gly Lys Leu Pro Trp Asn Leu Pro Thr Asp Leu
        35                  40                  45

Lys Phe Phe Lys Asp Ile Thr Leu Thr Thr Ser Asp Ser Ser Lys Lys
    50                  55                  60

Asn Ala Val Val Met Gly Arg Lys Thr Trp Glu Ser Ile Pro Ile Lys
65                  70                  75                  80

Tyr Arg Pro Leu Ser Gly Arg Leu Asn Val Val Leu Thr Arg Ser Gly
                85                  90                  95

Gly Phe Asp Ile Ala Asn Thr Glu Asn Val Val Thr Cys Ser Ser Val
            100                 105                 110

Asp Ser Ala Leu Asp Leu Leu Ala Ala Pro Pro Tyr Cys Leu Ser Ile
        115                 120                 125

Glu Arg Val Phe Val Ile Gly Gly Gly Asp Ile Leu Arg Glu Ala Leu
    130                 135                 140

Asn Arg Pro Ser Cys Asp Ala Ile His Leu Thr Glu Ile Asp Thr Ser
145                 150                 155                 160

Val Asp Cys Asp Thr Phe Ile Pro Ala Ile Asp Thr Ser Val Tyr Gln
                165                 170                 175

Pro Trp Ser Ser Ser Phe Pro Val Thr Glu Asn Gly Leu Arg Phe Cys
            180                 185                 190

Phe Thr Thr Phe Val Arg Val Lys Ser Ser Ala Asp Glu Ser Ser Asp
        195                 200                 205

Glu Ser Asn Gly Ser Gln Ser Leu Gln Phe Asp Gly Lys Lys Phe Leu
    210                 215                 220

Phe Leu Pro Lys Met Val Phe Asp Gln His Glu Glu Phe Leu Tyr Leu
225                 230                 235                 240

Asn Met Val Glu Asp Ile Ile Ser Asn Gly Asn Val Lys Asn Asp Arg
                245                 250                 255

Thr Gly Thr Gly Thr Leu Ser Lys Phe Gly Cys Gln Met Lys Phe Asn
            260                 265                 270
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```
Leu Arg Arg Ser Phe Pro Leu Leu Thr Thr Lys Arg Val Phe Trp Arg
        275                 280                 285

Gly Val Val Glu Glu Leu Leu Trp Phe Ile Ser Gly Ser Thr Asn Ala
    290                 295                 300

Lys Val Leu Gln Glu Lys Gly Ile His Ile Trp Asp Gly Asn Ala Ser
305                 310                 315                 320

Arg Glu Tyr Leu Asp Gly Ile Gly Leu Thr Glu Arg Glu Glu Gly Asp
                325                 330                 335

Leu Gly Pro Val Tyr Gly Phe Gln Trp Arg His Phe Gly Ala Lys Tyr
            340                 345                 350

Thr Asp Met His Ala Asp Tyr Thr Gly Gln Gly Phe Asp Gln Leu Val
        355                 360                 365

Asp Val Ile Asp Lys Ile Lys Asn Asn Pro Asp Asp Arg Arg Ile Ile
    370                 375                 380

Met Ser Ala Trp Asn Pro Ser Asp Leu Lys Leu Met Ala Leu Pro Pro
385                 390                 395                 400

Cys His Met Phe Ala Gln Phe Tyr Val Ala Glu Gly Glu Leu Ser Cys
                405                 410                 415

Gln Met Tyr Gln Arg Ser Ala Asp Met Gly Leu Gly Val Pro Phe Asn
            420                 425                 430

Ile Ala Ser Tyr Ser Leu Leu Thr Cys Met Leu Ala His Val Cys Asp
        435                 440                 445

Leu Val Pro Gly Asp Phe Ile His Val Leu Gly Asp Ala His Val Tyr
    450                 455                 460

Lys Thr His Val Arg Pro Leu Gln Glu Gln Leu Leu Asn Leu Pro Lys
465                 470                 475                 480

Pro Phe Pro Val Met Lys Ile Asn Pro Glu Lys Lys Gln Ile Asp Ser
                485                 490                 495

Phe Val Ala Ser Asp Phe Asp Leu Thr Gly Tyr Asp Pro His Lys Lys
            500                 505                 510

Ile Glu Met Lys Met Ala Val
        515
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<210> 49
<211> 1479
<212> DNA
<213> Arabidopsis thaliana

<400> 49

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aggaggagtt accaagttgt aatagcggcg acaagagaca tgggtcttgg tatggacatg 120

aaacttcctt gggatctacc ttcagagtat cagtttttcc aagatgttac aactaggaca 180

tccgatccca cgaagaggaa cgcgactata atgggaagaa aatcatggga atctactcct 240

ctagagattc gtcctcttcc tggtcggctc aatattgtct tgacaaagtc tagctgccac 300

aacattgcca ttgatgagaa tgtactggtg tctagtagca tggaatcggc tcttgaactt 360

ctagccactg agccctattc cttgtccatt gagaaggtct ttgtcatagg aggcggcgag 420

ttgttaagga attatatgaa tgcatccatc tgtgatgcta tccacctaac cgaaatcgat 480

ataagcgtgc catgtgacgc atttgcaccg agagtggata cttctctgta ccgtccgtgg 540

tactcatcat ttccagttgt ggaaaatgga attcggtata gtttcaacac ttatgtccga 600

agaaaagatg ccattgttgg ctccggtgaa aagaaaagtg ttgctgagtc agatttgaag 660

gagtactcgt ttttgcctaa gatggttttc gagaggcatg aggagtttgg ttacttgaat 720

cttgttcaaa acattatatc tagtggagac atgaatgaca atagtactct ttctaaattt 780

ggctgtcaga tgcggttcaa tctgcgcaag actttcccgc ttctcacgac caagaaaata 840

ttctggcttg gtgttgtaga ggaaatacta caacttatca gtggttcaaa caatcccaag 900

gaaaacggta gtcatatatg ggacaccgat gaggcaaaag aatatcttga cagtttcgga 960

gtgaatgcca ccgaagaaga tggagacaac ccattcttgc atggacttca ctggaaacat 1020

tgtgatgcta ggtttgtgat tcaagaattc agtcagctct ctgatgttat aaacaaaata 1080

aagaacaatc ctcatgatca aaggatcatg cttgccgctt gtaatccatt agatttcaag 1140

ttgtcggtat ctccttgtca tacgttcaca cagttctatg tggcaaatgg tgaagtttct 1200

tgtcaaatat accaaagctc aaccgaagcg agtatcggga ttcctttcag tatcgctaca 1260

tactctcttt tgacatgcat catcgctcat gtttgcgatc ttggagctgg tgatttcatc 1320

catgtgattg gacaagccta tattaacaaa gctcacgtca aggctataca aaaacagctt 1380

caaatctccc ctaaaccctt cccgattttg aaaatcaacc ctgagaaaaa gaagatggac 1440

aactttgagg cctctgattt ggaactcatg aggatataa 1479

<210> 50
<211> 492
<212> PRT
<213> Arabidopsis thaliana

<400> 50

Met Ala Ser Thr Gly Glu Thr Ile Cys Asn Asn Gly Gln Ser Ala Val
1 5 10 15

Ser Val Thr Arg Arg Arg Ser Tyr Gln Val Val Ile Ala Ala Thr Arg
20 25 30

Asp Met Gly Leu Gly Met Asp Met Lys Leu Pro Trp Asp Leu Pro Ser
35 40 45

Glu Tyr Gln Phe Phe Gln Asp Val Thr Thr Arg Thr Ser Asp Pro Thr

```
    50                  55                  60

Lys Arg Asn Ala Thr Ile Met Gly Arg Lys Ser Trp Glu Ser Thr Pro
65                  70                  75                  80

Leu Glu Ile Arg Pro Leu Pro Gly Arg Leu Asn Ile Val Leu Thr Lys
                85                  90                  95

Ser Ser Cys His Asn Ile Ala Ile Asp Glu Asn Val Leu Val Ser Ser
            100                 105                 110

Ser Met Glu Ser Ala Leu Glu Leu Leu Ala Thr Glu Pro Tyr Ser Leu
        115                 120                 125

Ser Ile Glu Lys Val Phe Val Ile Gly Gly Gly Glu Leu Leu Arg Asn
    130                 135                 140

Tyr Met Asn Ala Ser Ile Cys Asp Ala Ile His Leu Thr Glu Ile Asp
145                 150                 155                 160

Ile Ser Val Pro Cys Asp Ala Phe Ala Pro Arg Val Asp Thr Ser Leu
                165                 170                 175

Tyr Arg Pro Trp Tyr Ser Ser Phe Pro Val Val Glu Asn Gly Ile Arg
            180                 185                 190

Tyr Ser Phe Asn Thr Tyr Val Arg Arg Lys Asp Ala Ile Val Gly Ser
        195                 200                 205

Gly Glu Lys Lys Ser Val Ala Glu Ser Asp Leu Lys Glu Tyr Ser Phe
    210                 215                 220

Leu Pro Lys Met Val Phe Glu Arg His Glu Glu Phe Gly Tyr Leu Asn
225                 230                 235                 240

Leu Val Gln Asn Ile Ile Ser Ser Gly Asp Met Asn Asp Asn Ser Thr
                245                 250                 255

Leu Ser Lys Phe Gly Cys Gln Met Arg Phe Asn Leu Arg Lys Thr Phe
            260                 265                 270

Pro Leu Leu Thr Thr Lys Lys Ile Phe Trp Leu Gly Val Val Glu Glu
        275                 280                 285

Ile Leu Gln Leu Ile Ser Gly Ser Asn Asn Pro Lys Glu Asn Gly Ser
    290                 295                 300

His Ile Trp Asp Thr Asp Glu Ala Lys Glu Tyr Leu Asp Ser Phe Gly
305                 310                 315                 320

Val Asn Ala Thr Glu Glu Asp Gly Asp Asn Pro Phe Leu His Gly Leu
                325                 330                 335
```

```
His Trp Lys His Cys Asp Ala Arg Phe Val Ile Gln Glu Phe Ser Gln
            340                 345                 350

Leu Ser Asp Val Ile Asn Lys Ile Lys Asn Asn Pro His Asp Gln Arg
        355                 360                 365

Ile Met Leu Ala Ala Cys Asn Pro Leu Asp Phe Lys Leu Ser Val Ser
    370                 375                 380

Pro Cys His Thr Phe Thr Gln Phe Tyr Val Ala Asn Gly Glu Val Ser
385                 390                 395                 400

Cys Gln Ile Tyr Gln Ser Ser Thr Glu Ala Ser Ile Gly Ile Pro Phe
                405                 410                 415

Ser Ile Ala Thr Tyr Ser Leu Leu Thr Cys Ile Ile Ala His Val Cys
            420                 425                 430

Asp Leu Gly Ala Gly Asp Phe Ile His Val Ile Gly Gln Ala Tyr Ile
        435                 440                 445

Asn Lys Ala His Val Lys Ala Ile Gln Lys Gln Leu Gln Ile Ser Pro
    450                 455                 460

Lys Pro Phe Pro Ile Leu Lys Ile Asn Pro Glu Lys Lys Lys Met Asp
465                 470                 475                 480

Asn Phe Glu Ala Ser Asp Leu Glu Leu Met Arg Ile
                485                 490
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<210> 51
<211> 1698
<212> DNA
<213> Arabidopsis thaliana

<400> 51

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ttcaaggttt caatttcaac catggcaaac actctcaatg gaaatgtgat catgacttca    180

aagcctcaga gtacttacca agttgtggta gctgcaacca aggaaatggg tattggtaaa    240

gacggaaaac ttccatggaa tttgcctacc gatctcaagt tcttcaagga tttaactttg    300

tccacttcgg attctgctaa gaagaacgct gttgttatgg gtaggaaaac gtgggagtct    360

attcccaaaa agtataggcc actctctggt cgcctgaatg ttgtcttgtc tcgttctagc    420

ggtttcgata tagccaacac tgaaaatgtt gtaacttgca gtagcataga ttctgctcta    480

gacttattag ctgcacctcc gtttagtctg tccattgaga aagtgtttgt aataggaggt    540

ggcgacatat tgagggaagc tttgaataaa ccgagctgtg aagccatcca cataactgag    600

attgatacaa gtatcgactg tgatacattt attcccacgg ttgacacttc tgcatatcag    660

ccttggtgtt cgtcgtttcc aatatgtgaa aatggtcttc gattttcctt cacgactcat    720

gttcgtgtaa agagttcttc tgccggtgaa gcctctgatg agagtgatgg gtcaaaggtt    780
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cttcaagttg attggaagaa gttttcttct gttcttccta aaatgatttt tgaccggcat 840

gaggaatatc tctacttaaa tctggtcaaa gagataatct caaatggaaa cttaaaagac 900

gataggacag ggactggtac attatctaaa tttggttgtc agatgaaatt caatttacgc 960

aggaattttc cacttctgac gacaaagaga gttttctgga gaggtgttgt tgaggaactt 1020

ctatggttca taagcggttc aaccaatgca aaggtacttc aagaaaaggg tatccgtata 1080

tgggatggga atgcgtcgag agcatatctt gatggtattg gactgactga gagagaggaa 1140

ggtgaccttg gacccgttta tggatttcag tggagacact ttggtgctaa gtacacagat 1200

atgcatgctg attatactgg ccaaggattt gatcagctct tagatgtaat taacaagatc 1260

aagaacaatc ctgatgatcg acggattata atgtcagctt ggaatccttc tgatcttaag 1320

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tcatgtcaaa tgtatcagcg ttcagccgat atgggtctcg gcgtaccgtt taacattgcc 1440

tcatactccc ttcttacatg cattcttgct cacgtctgcg atcttgttcc tggtgatttt 1500

atccatgtga ttggagatgc tcatgtttac aaaaaccatg tcaggcctct gcaagagcaa 1560

cttgagaacc caccaaaacc ttttcctgtt ttgaagataa atccagagaa gaaagatata 1620

gattcttttg ttgcggatga ctttgagctc attggctatg atcctcacaa gaaaatagat 1680

atgaaaatgg ctgtttag 1698

<210> 52
<211> 565
<212> PRT
<213> Arabidopsis thaliana

<400> 52

Met Arg Cys Leu Gln Asn Ser Ala Lys Thr Leu Pro Leu Ala Phe Lys
1 5 10 15

Ser Ala Leu Leu Pro Leu Ser Gln Arg Trp Phe Cys Lys Phe Ser Pro
20 25 30

Lys Pro Ser Ser Leu Thr Asn Ile Phe Lys Val Ser Ile Ser Thr Met
35 40 45

Ala Asn Thr Leu Asn Gly Asn Val Ile Met Thr Ser Lys Pro Gln Ser
50 55 60

Thr Tyr Gln Val Val Val Ala Ala Thr Lys Glu Met Gly Ile Gly Lys
65 70 75 80

Asp Gly Lys Leu Pro Trp Asn Leu Pro Thr Asp Leu Lys Phe Phe Lys
85 90 95

Asp Leu Thr Leu Ser Thr Ser Asp Ser Ala Lys Lys Asn Ala Val Val
100 105 110

Met Gly Arg Lys Thr Trp Glu Ser Ile Pro Lys Lys Tyr Arg Pro Leu
115 120 125

```
Ser Gly Arg Leu Asn Val Val Leu Ser Arg Ser Ser Gly Phe Asp Ile
    130                 135                 140

Ala Asn Thr Glu Asn Val Val Thr Cys Ser Ser Ile Asp Ser Ala Leu
145                 150                 155                 160

Asp Leu Leu Ala Ala Pro Pro Phe Ser Leu Ser Ile Glu Lys Val Phe
                165                 170                 175

Val Ile Gly Gly Gly Asp Ile Leu Arg Glu Ala Leu Asn Lys Pro Ser
            180                 185                 190

Cys Glu Ala Ile His Ile Thr Glu Ile Asp Thr Ser Ile Asp Cys Asp
        195                 200                 205

Thr Phe Ile Pro Thr Val Asp Thr Ser Ala Tyr Gln Pro Trp Cys Ser
    210                 215                 220

Ser Phe Pro Ile Cys Glu Asn Gly Leu Arg Phe Ser Phe Thr Thr His
225                 230                 235                 240

Val Arg Val Lys Ser Ser Ser Ala Gly Glu Ala Ser Asp Glu Ser Asp
                245                 250                 255

Gly Ser Lys Val Leu Gln Val Asp Trp Lys Lys Phe Ser Ser Val Leu
            260                 265                 270

Pro Lys Met Ile Phe Asp Arg His Glu Glu Tyr Leu Tyr Leu Asn Leu
        275                 280                 285

Val Lys Glu Ile Ile Ser Asn Gly Asn Leu Lys Asp Asp Arg Thr Gly
    290                 295                 300

Thr Gly Thr Leu Ser Lys Phe Gly Cys Gln Met Lys Phe Asn Leu Arg
305                 310                 315                 320

Arg Asn Phe Pro Leu Leu Thr Thr Lys Arg Val Phe Trp Arg Gly Val
                325                 330                 335

Val Glu Glu Leu Leu Trp Phe Ile Ser Gly Ser Thr Asn Ala Lys Val
            340                 345                 350

Leu Gln Glu Lys Gly Ile Arg Ile Trp Asp Gly Asn Ala Ser Arg Ala
        355                 360                 365

Tyr Leu Asp Gly Ile Gly Leu Thr Glu Arg Glu Glu Gly Asp Leu Gly
    370                 375                 380

Pro Val Tyr Gly Phe Gln Trp Arg His Phe Gly Ala Lys Tyr Thr Asp
385                 390                 395                 400

Met His Ala Asp Tyr Thr Gly Gln Gly Phe Asp Gln Leu Leu Asp Val
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405 410 415

Ile Asn Lys Ile Lys Asn Asn Pro Asp Asp Arg Arg Ile Ile Met Ser
420 425 430

Ala Trp Asn Pro Ser Asp Leu Lys Leu Met Ala Leu Pro Pro Cys His
435 440 445

Met Phe Ala Gln Phe Tyr Val Ala Asn Gly Glu Leu Ser Cys Gln Met
450 455 460

Tyr Gln Arg Ser Ala Asp Met Gly Leu Gly Val Pro Phe Asn Ile Ala
465 470 475 480

Ser Tyr Ser Leu Leu Thr Cys Ile Leu Ala His Val Cys Asp Leu Val
485 490 495

Pro Gly Asp Phe Ile His Val Ile Gly Asp Ala His Val Tyr Lys Asn
500 505 510

His Val Arg Pro Leu Gln Glu Gln Leu Glu Asn Pro Pro Lys Pro Phe
515 520 525

Pro Val Leu Lys Ile Asn Pro Glu Lys Lys Asp Ile Asp Ser Phe Val
530 535 540

Ala Asp Asp Phe Glu Leu Ile Gly Tyr Asp Pro His Lys Lys Ile Asp
545 550 555 560

Met Lys Met Ala Val
565

<210> 53
<211> 1716
<212> DNA
<213> Arabidopsis thaliana

<400> 53
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tgtcaactct cgattcctct cactcttcgg ctccaccatc actaccaaca ccaccagcct 120

cacctaccat ctcctctctc ttttcagatt cattcgttaa gaaagcagat cgacatggca 180

gctcaaggag gtgattcata tgaggaagcg ttggctgctt tgtcgtcttt gatcacgaaa 240

cgaagtcgtg ctgataagag caataaaggg gatcgctttg agttagtctt tgattatctc 300

aagctacttg acctggaaga agacatttta aagatgaatg ttattcatgt cgctggtacc 360

aaaggcaagg gatccacatg tacctttaca gagtctatta ttcgaaacta tggctttcga 420

actggactct tcacttcacc tcacctcatt gatgtccggg aaagatttcg tttggatggt 480

gtggacataa gtgaagagaa atttttggga tatttctggt ggtgctataa caggctcaag 540

gagagaacta acgaggagat accaatgcct acatatttcc gcttccttgc attgctagct 600

tttaaaatat ttgctgcaga agaggtagat gctgctatat tggaggttgg attaggtgga 660

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aagtttgatg ccaccaatgc ggttcacaaa cctgtggtat gtggtatttc ttcactcgga    720

tatgaccaca tggaaattct aggtgataca cttggaaaaa ttgctggtga gaaggctgga    780

attttcaagc ttggagttcc agctttcaca gtgccccaac ctgatgaagc catgcgtgtc    840

cttgaagaga aagcttccga aacagaagtg aatctcgaag tggtgcagcc actaaccgca    900

aggctgttaa gtggtcagaa acttgggctt gatggggaac accaatatgt caatgctggt    960

ctagcagttt cgcttgcctc tatctggctt cagcaaattg gtaaactaga agttccgagt   1020

cggactcaga tgagtattct gcctgagaaa ttcatcaaag ggttagctac agcgagtttg   1080

caaggacgag cacaggtcgt ccctgatcaa tatactgaat ctcggacttc aggagatcta   1140

gtattttatc tggatggagc tcacagtcca gaaagcatgg aagcatgcgc caaatggttt   1200

tcggttgcgg ttaagggaga caaccagtca gggagttcag gacatttggt taatggctct   1260

gcaggatcct ctcatgataa atggtcaaat gaaacctgtg aacagatatt gttgttcaat   1320

tgtatgtcag ttcgggaccc aaatctactg cttccacatc taaagaatat gtgcgcaaaa   1380

tacggtgtca atttcaagaa ggcattgttt gtaccaaaca tgtcggtgta tcataaggtt   1440

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agtgatggaa acagtgaggt gtttacttca ctacccatgg caataaaatg tctaagggac   1620

actgtacatg agagtagctc agccacacgt ttccaggtcc ttgtaactgg ttcgttacat   1680

cttgtgggcg atgtactgag attaatcaga aaatga                              1716
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<210> 54
<211> 571
<212> PRT
<213> Arabidopsis thaliana

<400> 54

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Met Phe Ala Val Ser Ile Val Pro Arg Thr Thr Ser Cys Arg Leu Ser
1               5                   10                  15

Ser Ala Phe Leu Cys Gln Leu Ser Ile Pro Leu Thr Leu Arg Leu His
            20                  25                  30

His His Tyr Gln His His Gln Pro His Leu Pro Ser Pro Leu Ser Phe
        35                  40                  45

Gln Ile His Ser Leu Arg Lys Gln Ile Asp Met Ala Ala Gln Gly Gly
    50                  55                  60

Asp Ser Tyr Glu Glu Ala Leu Ala Ala Leu Ser Ser Leu Ile Thr Lys
65                  70                  75                  80

Arg Ser Arg Ala Asp Lys Ser Asn Lys Gly Asp Arg Phe Glu Leu Val
                85                  90                  95

Phe Asp Tyr Leu Lys Leu Leu Asp Leu Glu Glu Asp Ile Leu Lys Met
            100                 105                 110
```

```
Asn Val Ile His Val Ala Gly Thr Lys Gly Lys Gly Ser Thr Cys Thr
        115                 120                 125

Phe Thr Glu Ser Ile Ile Arg Asn Tyr Gly Phe Arg Thr Gly Leu Phe
    130                 135                 140

Thr Ser Pro His Leu Ile Asp Val Arg Glu Arg Phe Arg Leu Asp Gly
145                 150                 155                 160

Val Asp Ile Ser Glu Glu Lys Phe Leu Gly Tyr Phe Trp Trp Cys Tyr
                165                 170                 175

Asn Arg Leu Lys Glu Arg Thr Asn Glu Glu Ile Pro Met Pro Thr Tyr
            180                 185                 190

Phe Arg Phe Leu Ala Leu Leu Ala Phe Lys Ile Phe Ala Ala Glu Glu
        195                 200                 205

Val Asp Ala Ala Ile Leu Glu Val Gly Leu Gly Gly Lys Phe Asp Ala
    210                 215                 220

Thr Asn Ala Val His Lys Pro Val Val Cys Gly Ile Ser Ser Leu Gly
225                 230                 235                 240

Tyr Asp His Met Glu Ile Leu Gly Asp Thr Leu Gly Lys Ile Ala Gly
                245                 250                 255

Glu Lys Ala Gly Ile Phe Lys Leu Gly Val Pro Ala Phe Thr Val Pro
            260                 265                 270

Gln Pro Asp Glu Ala Met Arg Val Leu Glu Glu Lys Ala Ser Glu Thr
        275                 280                 285

Glu Val Asn Leu Glu Val Val Gln Pro Leu Thr Ala Arg Leu Leu Ser
    290                 295                 300

Gly Gln Lys Leu Gly Leu Asp Gly Glu His Gln Tyr Val Asn Ala Gly
305                 310                 315                 320

Leu Ala Val Ser Leu Ala Ser Ile Trp Leu Gln Gln Ile Gly Lys Leu
                325                 330                 335

Glu Val Pro Ser Arg Thr Gln Met Ser Ile Leu Pro Glu Lys Phe Ile
            340                 345                 350

Lys Gly Leu Ala Thr Ala Ser Leu Gln Gly Arg Ala Gln Val Val Pro
        355                 360                 365

Asp Gln Tyr Thr Glu Ser Arg Thr Ser Gly Asp Leu Val Phe Tyr Leu
    370                 375                 380

Asp Gly Ala His Ser Pro Glu Ser Met Glu Ala Cys Ala Lys Trp Phe
385                 390                 395                 400
```

Ser Val Ala Val Lys Gly Asp Asn Gln Ser Gly Ser Ser Gly His Leu
405 410 415

Val Asn Gly Ser Ala Gly Ser Ser His Asp Lys Trp Ser Asn Glu Thr
420 425 430

Cys Glu Gln Ile Leu Leu Phe Asn Cys Met Ser Val Arg Asp Pro Asn
435 440 445

Leu Leu Leu Pro His Leu Lys Asn Met Cys Ala Lys Tyr Gly Val Asn
450 455 460

Phe Lys Lys Ala Leu Phe Val Pro Asn Met Ser Val Tyr His Lys Val
465 470 475 480

Gly Thr Ala Ala Asp Leu Pro Glu Asn Asp Pro Gln Val Asp Leu Ser
485 490 495

Trp Gln Phe Thr Leu Gln Lys Val Trp Glu Ser Leu Val Gln Ser Glu
500 505 510

Arg Asp Gly Glu Lys Asp Gly Glu Ser Asp Gly Asn Ser Glu Val Phe
515 520 525

Thr Ser Leu Pro Met Ala Ile Lys Cys Leu Arg Asp Thr Val His Glu
530 535 540

Ser Ser Ser Ala Thr Arg Phe Gln Val Leu Val Thr Gly Ser Leu His
545 550 555 560

Leu Val Gly Asp Val Leu Arg Leu Ile Arg Lys
565 570

<210> 55
<211> 1878
<212> DNA
<213> Arabidopsis thaliana

<400> 55
atgctcgttt gtgggaaagg gtttctaaag tgcagagcac ctggagttcc attcttttgt 60

gacaaaagaa aatccttctt cactaaaact aagaggggct ttcacagttt acctttgggc 120

actggggtcc gtgtttattt caacaacaat cttaggtact caagcaattc aatagaagtt 180

gtggagaaag ctgccattaa tatgggttca aaggaagaca aggcagataa tccagcttta 240

tcttcatatg atgatgccat ggaagctctg tcgactctta tttctcgtcg aaaccgtggg 300

gatcgcacac ctactaaagg aaatcgtgac aagcttgaac aagtcgtcac atatctcaag 360

attttggacc tggaagacaa aataaaagaa ctaaaagtta ttcatgtcgc aggaacaaaa 420

ggaaagggtt caacatgtgt cttcagtgag gcaattttac gtaattgtgg gtttcgaacc 480

ggaatgttta catctcctca cttgattgat gtgagggaaa gattccgaat agatggcttg 540

gatatatctg aggaaaagtt tctacagtac ttctgggaat gttggaagtt actgaaggag 600

aaagctgtag atggtcttac catgcctcct ctttttcagt ttctcacagt attggcattt 660

aagatttttg tttgtgaaaa ggttgatgtt gctgtcattg aagttggact tgggggaaaa 720

cttgactcga caaatgtgat tcaaaaacct gttgtctgtg gcattgcttc tcttgggatg 780

gatcatatgg acatattggg aaatacgcta gctgatattg cctttcataa ggctgggatt 840

ttcaagcctc aaatccccgc cttcacagta ccacaactct ctgaagcaat ggatgttctt 900

cagaaaacag ctaataatct cgaggttcct ctagaagtag tagcgcctct tgaacctaaa 960

aagttggacg gagttacgct tggcttgtct ggggatcatc agctagtaaa tgcaggtctt 1020

gctgtttctc tttcaagatg ctggcttcaa agaaccggga attggaagaa gatatttcca 1080

aatgaaagca aggaaactga gattcccgtg gcattttgtc gtggtcttgc aacggcacgt 1140

cttcatggga gagctcaagt tgttcatgat gtagtttcag atccgcagga ctcatcagac 1200

tcgatggaaa ctccatgcgg tgatctgatc ttttacttgg atggtgctca cagtccacag 1260

agcatggagg cttgtggtcg atggttctct tctgcagtca gaggagacaa aagcttatcc 1320

actgctgtca atggttacat gagacatggg gagtatggta cagacttaaa cagagtctcc 1380

aaacagattc ttctgttcaa ctgcatggaa gtgagagacc ctcaagtctt acttccaaag 1440

ctggtcacca cttgcgcttc ctcagacact catttctcaa gagcgctttt tgtcccgagc 1500

atgtctactt acaacaaagt catttcgggt gcatcagcga ttccttcaga tacacgtaga 1560

aaggatttga cttggcaatt cagactacaa agactatggg agaaatcaat ccaagggact 1620

gatgcggggc ttgaccatac actgaaaccc gatggaataa ccgccttacc acctcatgat 1680

ttcctgtgcg gagatgcacc tcaatgtggt ggacctgcag ggacgccggt cacttccagt 1740

gccgtaatgc cttcacttcc attgactata aactggctaa gagactgcgt acgccgaaac 1800

ccttcactga aactagaggt tctggtcaca ggatcgctac atcttgttgg agatgtgctc 1860

aggttgctaa agagatga 1878

<210> 56
<211> 625
<212> PRT
<213> Arabidopsis thaliana

<400> 56

Met Leu Val Cys Gly Lys Gly Phe Leu Lys Cys Arg Ala Pro Gly Val
1 5 10 15

Pro Phe Phe Cys Asp Lys Arg Lys Ser Phe Phe Thr Lys Thr Lys Arg
20 25 30

Gly Phe His Ser Leu Pro Leu Gly Thr Gly Val Arg Val Tyr Phe Asn
35 40 45

Asn Asn Leu Arg Tyr Ser Ser Asn Ser Ile Glu Val Val Glu Lys Ala
50 55 60

Ala Ile Asn Met Gly Ser Lys Glu Asp Lys Ala Asp Asn Pro Ala Leu
65 70 75 80

```
Ser Ser Tyr Asp Asp Ala Met Glu Ala Leu Ser Thr Leu Ile Ser Arg
                85                  90                  95

Arg Asn Arg Gly Asp Arg Thr Pro Thr Lys Gly Asn Arg Asp Lys Leu
            100                 105                 110

Glu Gln Val Val Thr Tyr Leu Lys Ile Leu Asp Leu Glu Asp Lys Ile
        115                 120                 125

Lys Glu Leu Lys Val Ile His Val Ala Gly Thr Lys Gly Lys Gly Ser
    130                 135                 140

Thr Cys Val Phe Ser Glu Ala Ile Leu Arg Asn Cys Gly Phe Arg Thr
145                 150                 155                 160

Gly Met Phe Thr Ser Pro His Leu Ile Asp Val Arg Glu Arg Phe Arg
                165                 170                 175

Ile Asp Gly Leu Asp Ile Ser Glu Glu Lys Phe Leu Gln Tyr Phe Trp
            180                 185                 190

Glu Cys Trp Lys Leu Leu Lys Glu Lys Ala Val Asp Gly Leu Thr Met
        195                 200                 205

Pro Pro Leu Phe Gln Phe Leu Thr Val Leu Ala Phe Lys Ile Phe Val
    210                 215                 220

Cys Glu Lys Val Asp Val Ala Val Ile Glu Val Gly Leu Gly Gly Lys
225                 230                 235                 240

Leu Asp Ser Thr Asn Val Ile Gln Lys Pro Val Val Cys Gly Ile Ala
                245                 250                 255

Ser Leu Gly Met Asp His Met Asp Ile Leu Gly Asn Thr Leu Ala Asp
            260                 265                 270

Ile Ala Phe His Lys Ala Gly Ile Phe Lys Pro Gln Ile Pro Ala Phe
        275                 280                 285

Thr Val Pro Gln Leu Ser Glu Ala Met Asp Val Leu Gln Lys Thr Ala
    290                 295                 300

Asn Asn Leu Glu Val Pro Leu Glu Val Val Ala Pro Leu Glu Pro Lys
305                 310                 315                 320

Lys Leu Asp Gly Val Thr Leu Gly Leu Ser Gly Asp His Gln Leu Val
                325                 330                 335

Asn Ala Gly Leu Ala Val Ser Leu Ser Arg Cys Trp Leu Gln Arg Thr
            340                 345                 350

Gly Asn Trp Lys Lys Ile Phe Pro Asn Glu Ser Lys Glu Thr Glu Ile
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        355                 360                 365

Pro Val Ala Phe Cys Arg Gly Leu Ala Thr Ala Arg Leu His Gly Arg
    370                 375                 380

Ala Gln Val Val His Asp Val Val Ser Asp Pro Gln Asp Ser Ser Asp
385                 390                 395                 400

Ser Met Glu Thr Pro Cys Gly Asp Leu Ile Phe Tyr Leu Asp Gly Ala
                405                 410                 415

His Ser Pro Gln Ser Met Glu Ala Cys Gly Arg Trp Phe Ser Ser Ala
            420                 425                 430

Val Arg Gly Asp Lys Ser Leu Ser Thr Ala Val Asn Gly Tyr Met Arg
        435                 440                 445

His Gly Glu Tyr Gly Thr Asp Leu Asn Arg Val Ser Lys Gln Ile Leu
    450                 455                 460

Leu Phe Asn Cys Met Glu Val Arg Asp Pro Gln Val Leu Leu Pro Lys
465                 470                 475                 480

Leu Val Thr Thr Cys Ala Ser Ser Asp Thr His Phe Ser Arg Ala Leu
                485                 490                 495

Phe Val Pro Ser Met Ser Thr Tyr Asn Lys Val Ile Ser Gly Ala Ser
            500                 505                 510

Ala Ile Pro Ser Asp Thr Arg Arg Lys Asp Leu Thr Trp Gln Phe Arg
        515                 520                 525

Leu Gln Arg Leu Trp Glu Lys Ser Ile Gln Gly Thr Asp Ala Gly Leu
    530                 535                 540

Asp His Thr Leu Lys Pro Asp Gly Ile Thr Ala Leu Pro Pro His Asp
545                 550                 555                 560

Phe Leu Cys Gly Asp Ala Pro Gln Cys Gly Gly Pro Ala Gly Thr Pro
                565                 570                 575

Val Thr Ser Ser Ala Val Met Pro Ser Leu Pro Leu Thr Ile Asn Trp
            580                 585                 590

Leu Arg Asp Cys Val Arg Arg Asn Pro Ser Leu Lys Leu Glu Val Leu
        595                 600                 605

Val Thr Gly Ser Leu His Leu Val Gly Asp Val Leu Arg Leu Leu Lys
    610                 615                 620

Arg
625
```

<210> 57
<211> 1479
<212> DNA
<213> Arabidopsis thaliana

<400> 57
atggcaactg aagacgatgg tgaattgtca gctcgttacc agaacacgtt ggatgcattg 60

tcgtctttga tcacaaaacg tggccgttta gctagtaaca accaatctca ccgattccgt 120

ttgctctttc attatctcaa ggttcttgag cttgaagatg cagtttcaca aatgaaaatc 180

attcatgtgg ccggaactaa aggaaaggga tcaacatgta catttgcgga gtctattctt 240

cgttgttacg gtcttcgaac tggtctcttc acatctcctc acttaatcga tgtccgagag 300

agattccgtc ttaacggcat tgagataagc caggagaaat ttgtgaacta cttttggtgt 360

tgctttcata agctcaagga gaaaaccagc aatgaggttc caatgcctac ttatttctgc 420

ttccttgctt tattagcttt caagattttc acaacagaac aggttgatgt tgttatacta 480

gaagttggct taggtgggag attcgatgcg actaatgtga ttcagaaacc tgtcgtctgt 540

ggtatttctt ctctagggta tgaccatatg gagattcttg gatacacact tgctgaaatt 600

gctgcagaga aagccggtat cttcaagagt ggagttcctg cttttacagt ggctcaacct 660

gatgaagcaa tgcgtgtact caatgaaaaa gcttcaaaat tggaggtgaa tcttcaggtg 720

gtggaaccgt tggactcaag ccagagactc gggcttcaag gcgaacatca atatctaaac 780

gctggtcttg ctgttgcgtt gtgctctaca tttcttaaag agattggtat tgaggacaag 840

aatggtttgg atcagacaaa cggtttaccc gaaaaattca tctctggatt gtcaaatgct 900

tatttgatgg gacgagctat gatagtgcct gattcagaac tccctgaaga gattgtgtat 960

taccttgatg gagctcatag tcctgaaagc atggaagctt gcgctatatg gttttcaaaa 1020

cagatcaaac aaaaccaaga aagaaaccag aaaagatcag agcagatact cttgttcaat 1080

tgtatgtctg ttcgtgaccc gagtttgctt cttccgcgat taaggagtaa atgcattgat 1140

caaggagttg atttcaagag agccgttttt gtgccaaacg tatcagtgta caaccaagtg 1200

ggatcttcga caaacgttgg cacacgtgtc gagtcgatgt cgtggcagtt cggtcttcag 1260

aggatttggg agagtttagc tcgaggtgaa gcaaaatcta attcaaaaag tgattctaaa 1320

ggcaaagaag aagagaagag tttcgttttc tcgtcacttc ctgtggctgt tgactggctc 1380

cgggacaatg ctcgccaaag taaacaagtt cgttttcagg tgttggtaac tggttcatta 1440

catttggtgg gtgatctctt gagatttatc aagaaatga 1479

<210> 58
<211> 492
<212> PRT
<213> Arabidopsis thaliana

<400> 58

Met Ala Thr Glu Asp Asp Gly Glu Leu Ser Ala Arg Tyr Gln Asn Thr
1 5 10 15

Leu Asp Ala Leu Ser Ser Leu Ile Thr Lys Arg Gly Arg Leu Ala Ser
20 25 30

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Asn Asn Gln Ser His Arg Phe Arg Leu Leu Phe His Tyr Leu Lys Val
        35                  40                  45

Leu Glu Leu Glu Asp Ala Val Ser Gln Met Lys Ile Ile His Val Ala
    50                  55                  60

Gly Thr Lys Gly Lys Gly Ser Thr Cys Thr Phe Ala Glu Ser Ile Leu
65                  70                  75                  80

Arg Cys Tyr Gly Leu Arg Thr Gly Leu Phe Thr Ser Pro His Leu Ile
                85                  90                  95

Asp Val Arg Glu Arg Phe Arg Leu Asn Gly Ile Glu Ile Ser Gln Glu
            100                 105                 110

Lys Phe Val Asn Tyr Phe Trp Cys Cys Phe His Lys Leu Lys Glu Lys
        115                 120                 125

Thr Ser Asn Glu Val Pro Met Pro Thr Tyr Phe Cys Phe Leu Ala Leu
    130                 135                 140

Leu Ala Phe Lys Ile Phe Thr Thr Glu Gln Val Asp Val Val Ile Leu
145                 150                 155                 160

Glu Val Gly Leu Gly Gly Arg Phe Asp Ala Thr Asn Val Ile Gln Lys
                165                 170                 175

Pro Val Val Cys Gly Ile Ser Ser Leu Gly Tyr Asp His Met Glu Ile
            180                 185                 190

Leu Gly Tyr Thr Leu Ala Glu Ile Ala Ala Glu Lys Ala Gly Ile Phe
        195                 200                 205

Lys Ser Gly Val Pro Ala Phe Thr Val Ala Gln Pro Asp Glu Ala Met
    210                 215                 220

Arg Val Leu Asn Glu Lys Ala Ser Lys Leu Glu Val Asn Leu Gln Val
225                 230                 235                 240

Val Glu Pro Leu Asp Ser Ser Gln Arg Leu Gly Leu Gln Gly Glu His
                245                 250                 255

Gln Tyr Leu Asn Ala Gly Leu Ala Val Ala Leu Cys Ser Thr Phe Leu
            260                 265                 270

Lys Glu Ile Gly Ile Glu Asp Lys Asn Gly Leu Asp Gln Thr Asn Gly
        275                 280                 285

Leu Pro Glu Lys Phe Ile Ser Gly Leu Ser Asn Ala Tyr Leu Met Gly
    290                 295                 300

Arg Ala Met Ile Val Pro Asp Ser Glu Leu Pro Glu Glu Ile Val Tyr
305                 310                 315                 320
```

```
Tyr Leu Asp Gly Ala His Ser Pro Glu Ser Met Glu Ala Cys Ala Ile
                325                 330                 335

Trp Phe Ser Lys Gln Ile Lys Gln Asn Gln Glu Arg Asn Gln Lys Arg
            340                 345                 350

Ser Glu Gln Ile Leu Leu Phe Asn Cys Met Ser Val Arg Asp Pro Ser
        355                 360                 365

Leu Leu Leu Pro Arg Leu Arg Ser Lys Cys Ile Asp Gln Gly Val Asp
    370                 375                 380

Phe Lys Arg Ala Val Phe Val Pro Asn Val Ser Val Tyr Asn Gln Val
385                 390                 395                 400

Gly Ser Ser Thr Asn Val Gly Thr Arg Val Glu Ser Met Ser Trp Gln
                405                 410                 415

Phe Gly Leu Gln Arg Ile Trp Glu Ser Leu Ala Arg Gly Glu Ala Lys
            420                 425                 430

Ser Asn Ser Lys Ser Asp Ser Lys Gly Lys Glu Glu Glu Lys Ser Phe
        435                 440                 445

Val Phe Ser Ser Leu Pro Val Ala Val Asp Trp Leu Arg Asp Asn Ala
    450                 455                 460

Arg Gln Ser Lys Gln Val Arg Phe Gln Val Leu Val Thr Gly Ser Leu
465                 470                 475                 480

His Leu Val Gly Asp Leu Leu Arg Phe Ile Lys Lys
                485                 490
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<210> 59
<211> 669
<212> DNA
<213> Escherichia coli

<400> 59

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atgccatcac tcagtaaaga agcggccctg gttcatgaag cgttagttgc gcgaggactg     60

gaaacaccgc tgcgcccgcc cgtgcatgaa atggataacg aaacgcgcaa aagccttatt    120

gctggtcata tgaccgaaat catgcagctg ctgaatctcg acctggctga tgacagtttg    180

atggaaacgc cgcatcgcat cgctaaaatg tatgtcgatg aaattttctc cggtctggat    240

tacgccaatt tcccgaaaat caccctcatt gaaaacaaaa tgaaggtcga tgaaatggtc    300

accgtgcgcg atatcactct gaccagcacc tgtgaacacc attttgttac catcgatggc    360

aaagcgacgg tggcctatat cccgaaagat tcggtgatcg gtctgtcaaa aattaaccgc    420

attgtgcagt tctttgccca gcgtccgcag gtgcaggaac gtctgacgca gcaaattctt    480

attgcgctac aaacgctgct gggcaccaat aacgtggctg tctcgatcga cgcggtgcat    540

tactgcgtga aggcgcgtgg catccgcgat gcaaccagtg ccacgacaac gacctctctt    600
```

ggtggattgt tcaaatccag tcagaatacg cgccacgagt ttctgcgcgc tgtgcgtcat 660

cacaactga 669

<210> 60
<211> 222
<212> PRT
<213> Escherichia coli

<400> 60

Met Pro Ser Leu Ser Lys Glu Ala Ala Leu Val His Glu Ala Leu Val
1 5 10 15

Ala Arg Gly Leu Glu Thr Pro Leu Arg Pro Pro Val His Glu Met Asp
20 25 30

Asn Glu Thr Arg Lys Ser Leu Ile Ala Gly His Met Thr Glu Ile Met
35 40 45

Gln Leu Leu Asn Leu Asp Leu Ala Asp Asp Ser Leu Met Glu Thr Pro
50 55 60

His Arg Ile Ala Lys Met Tyr Val Asp Glu Ile Phe Ser Gly Leu Asp
65 70 75 80

Tyr Ala Asn Phe Pro Lys Ile Thr Leu Ile Glu Asn Lys Met Lys Val
85 90 95

Asp Glu Met Val Thr Val Arg Asp Ile Thr Leu Thr Ser Thr Cys Glu
100 105 110

His His Phe Val Thr Ile Asp Gly Lys Ala Thr Val Ala Tyr Ile Pro
115 120 125

Lys Asp Ser Val Ile Gly Leu Ser Lys Ile Asn Arg Ile Val Gln Phe
130 135 140

Phe Ala Gln Arg Pro Gln Val Gln Glu Arg Leu Thr Gln Gln Ile Leu
145 150 155 160

Ile Ala Leu Gln Thr Leu Leu Gly Thr Asn Asn Val Ala Val Ser Ile
165 170 175

Asp Ala Val His Tyr Cys Val Lys Ala Arg Gly Ile Arg Asp Ala Thr
180 185 190

Ser Ala Thr Thr Thr Thr Ser Leu Gly Gly Leu Phe Lys Ser Ser Gln
195 200 205

Asn Thr Arg His Glu Phe Leu Arg Ala Val Arg His His Asn
210 215 220

<210> 61
<211> 726

<212> DNA
<213> Mus musculus

<400> 61
atggagaagc cgcggggagt caggtgcacc aatgggttct ccgagcggga gctgccgcgg 60

cccggggcca gcccgcctgc cgagaagtcc cggccgcccg aggccaaggg cgcacagccg 120

gccgacgcct ggaaggcagg gcggcaccgc agcgaggagg aaaaccaggt gaacctcccc 180

aaactggcgg ctgcttactc gtccattctg ctctcgctgg gcgaggaccc ccagcggcag 240

gggctgctca agacgccctg gagggcggcc accgccatgc agtacttcac caagggatac 300

caggagacca tctcagatgt cctgaatgat gctatatttg atgaagatca tgacgagatg 360

gtgattgtga aggacataga tatgttctcc atgtgtgagc atcaccttgt tccatttgta 420

ggaagggtcc atattggcta tcttcctaac aagcaagtcc ttggtctcag taaacttgcc 480

aggattgtag aaatctacag tagacgacta caagttcaag agcgcctcac caaacagatt 540

gcggtggcca tcacagaagc cttgcagcct gctggcgttg gagtagtgat tgaagcgaca 600

cacatgtgca tggtaatgcg aggcgtgcag aaaatgaaca gcaagactgt cactagcacc 660

atgctgggcg tgttccggga agaccccaag actcgggagg agttcctcac actaatcagg 720

agctga 726

<210> 62
<211> 241
<212> PRT
<213> Mus musculus

<400> 62

Met Glu Lys Pro Arg Gly Val Arg Cys Thr Asn Gly Phe Ser Glu Arg
1 5 10 15

Glu Leu Pro Arg Pro Gly Ala Ser Pro Pro Ala Glu Lys Ser Arg Pro
20 25 30

Pro Glu Ala Lys Gly Ala Gln Pro Ala Asp Ala Trp Lys Ala Gly Arg
35 40 45

His Arg Ser Glu Glu Glu Asn Gln Val Asn Leu Pro Lys Leu Ala Ala
50 55 60

Ala Tyr Ser Ser Ile Leu Leu Ser Leu Gly Glu Asp Pro Gln Arg Gln
65 70 75 80

Gly Leu Leu Lys Thr Pro Trp Arg Ala Ala Thr Ala Met Gln Tyr Phe
85 90 95

Thr Lys Gly Tyr Gln Glu Thr Ile Ser Asp Val Leu Asn Asp Ala Ile
100 105 110

Phe Asp Glu Asp His Asp Glu Met Val Ile Val Lys Asp Ile Asp Met
115 120 125

Phe Ser Met Cys Glu His His Leu Val Pro Phe Val Gly Arg Val His

130 135 140

Ile Gly Tyr Leu Pro Asn Lys Gln Val Leu Gly Leu Ser Lys Leu Ala
145 150 155 160

Arg Ile Val Glu Ile Tyr Ser Arg Arg Leu Gln Val Gln Glu Arg Leu
165 170 175

Thr Lys Gln Ile Ala Val Ala Ile Thr Glu Ala Leu Gln Pro Ala Gly
180 185 190

Val Gly Val Val Ile Glu Ala Thr His Met Cys Met Val Met Arg Gly
195 200 205

Val Gln Lys Met Asn Ser Lys Thr Val Thr Ser Thr Met Leu Gly Val
210 215 220

Phe Arg Glu Asp Pro Lys Thr Arg Glu Glu Phe Leu Thr Leu Ile Arg
225 230 235 240

Ser

<210> 63
<211> 564
<212> DNA
<213> Escherichia coli

<400> 63
atgatcctgc ttatagataa ctacgattct tttacctgga acctctacca gtacttttgt 60

gaactggggg cggatgtgct ggttaagcgc aacgatgcgt tgacgctggc ggatatcgac 120

gcccttaaac cacaaaaagt tgtcatctca cccggcccct gtacgccaga tgaagccggg 180

atctcccttg acgttattcg ccactatgcc gggcgcttgc cgattcttgg cgtctgcctc 240

ggtcatcagg caatggcgca ggcatttggc ggtaaagttg tgcgcgccgc aaaggtcatg 300

cacggcaaaa cctcgccgat tacacataac ggtgagggcg tatttcgggg gctggcaaat 360

ccacttaccg tgacacgcta tcattcgctg gtagtggaac ctgactcgtt accagcgtgc 420

tttgaagtga cggcctggag cgaaacccgc gagattatgg ggattcgcca tcgccagtgg 480

gatctggaag gtgtgcagtt ccatccagaa agtattctta gcgaacaagg acatcaactg 540

ctggctaatt tcctgcatcg ctga 564

<210> 64
<211> 187
<212> PRT
<213> Escherichia coli

<400> 64

Met Ile Leu Leu Ile Asp Asn Tyr Asp Ser Phe Thr Trp Asn Leu Tyr
1 5 10 15

Gln Tyr Phe Cys Glu Leu Gly Ala Asp Val Leu Val Lys Arg Asn Asp
20 25 30

```
Ala Leu Thr Leu Ala Asp Ile Asp Ala Leu Lys Pro Gln Lys Val Val
        35                  40                  45

Ile Ser Pro Gly Pro Cys Thr Pro Asp Glu Ala Gly Ile Ser Leu Asp
    50                  55                  60

Val Ile Arg His Tyr Ala Gly Arg Leu Pro Ile Leu Gly Val Cys Leu
65                  70                  75                  80

Gly His Gln Ala Met Ala Gln Ala Phe Gly Gly Lys Val Val Arg Ala
                85                  90                  95

Ala Lys Val Met His Gly Lys Thr Ser Pro Ile Thr His Asn Gly Glu
            100                 105                 110

Gly Val Phe Arg Gly Leu Ala Asn Pro Leu Thr Val Thr Arg Tyr His
        115                 120                 125

Ser Leu Val Val Glu Pro Asp Ser Leu Pro Ala Cys Phe Glu Val Thr
    130                 135                 140

Ala Trp Ser Glu Thr Arg Glu Ile Met Gly Ile Arg His Arg Gln Trp
145                 150                 155                 160

Asp Leu Glu Gly Val Gln Phe His Pro Glu Ser Ile Leu Ser Glu Gln
                165                 170                 175

Gly His Gln Leu Leu Ala Asn Phe Leu His Arg
            180                 185
```

<210> 65
<211> 1362
<212> DNA
<213> Escherichia coli

<400> 65

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tatttctccc gcttaagcca cctgccgtgg gcgatgcttt tacactccgg ctatgccgat    120

catccatata gccgctttga tattgtggtc gccgagccga tttgcacttt aaccactttc    180

ggtaaagaaa ccgttgttag tgaaagcgaa aaacgcacaa cgaccactga tgacccgcta    240

caggtgctcc agcaggtgct ggatcgcgca gacattcgcc cagcgcataa cgaagatttg    300

ccatttcagg gcggcgcgct ggggttgttt ggctacgatc tgggccgccg ttttgagtca    360

ctgccagaaa ttgcacagca agatatcgtt ctgccggata tggctgtggg tatctacgac    420

tgggcgctgg ttgttgacca ccagcgtcaa acagtttctt tgctgagtca taatgatgtc    480

aatgctcgtc gggcctggct ggaaagccag caattctcgc cgcaggaaga tttcacgctc    540

acttccgact ggcaatccaa tatgacccgc gagcagtacg gcgaaaaatt tcgccaggta    600

caggaatatc tgcacagcgg tgattgctat caggtgaatc tcgcccagcg ttttcatgcg    660

acctattctg gcgatgaatg gcaggcattc cttcagctta atcaggccaa ccgcgcgcca    720
```

tttagcgctt ttttacgtct tgaacagagt gcaattttaa gcctttcgcc agagcggttt 780

attctttgtg ataatagtga aatccagacc cgcccgatta aaggcacgct accacgcctg 840

cccgatcctc aggaagatag caaacaagca gaaaaactgg cgaactcagc gaaagatcgt 900

gccgaaaatc tgatgattgt cgatttaatg cgtaatgata tcggtcgtgt tgccgtagca 960

ggttcggtaa aagtaccaga gctgttcgtg gtggaaccct tccctgccgt gcatcatctg 1020

gtcagcacca taacggcgca actaccagaa cagttacacg ccagcgatct gctgcgcgcg 1080

gcttttcctg gtggctcaat aaccggggct ccgaaagtac gggctatgga aattatcgac 1140

gaactggaac cgcagcgacg caatgcctgg tgcggcagca ttggctattt gagcttttgc 1200

ggcaacatgg acaccagcat tactatccgc acgctgactg ccattaacgg acaaatttac 1260

tgctctgcgg ggggtggaat tgtcgccgat agccaggaag aagcggaata tcaggaaact 1320

tttgataaag ttaataagat attacgccaa ctggagaagt aa 1362

<210> 66
<211> 453
<212> PRT
<213> Escherichia coli

<400> 66

Met Lys Thr Leu Ser Pro Ala Val Ile Thr Leu Pro Trp Arg Gln Asp
1 5 10 15

Ala Ala Glu Leu Tyr Phe Ser Arg Leu Ser His Leu Pro Trp Ala Met
20 25 30

Leu Leu His Ser Gly Tyr Ala Asp His Pro Tyr Ser Arg Phe Asp Ile
35 40 45

Val Val Ala Glu Pro Ile Cys Thr Leu Thr Thr Phe Gly Lys Glu Thr
50 55 60

Val Val Ser Glu Ser Glu Lys Arg Thr Thr Thr Thr Asp Asp Pro Leu
65 70 75 80

Gln Val Leu Gln Gln Val Leu Asp Arg Ala Asp Ile Arg Pro Ala His
85 90 95

Asn Glu Asp Leu Pro Phe Gln Gly Gly Ala Leu Gly Leu Phe Gly Tyr
100 105 110

Asp Leu Gly Arg Arg Phe Glu Ser Leu Pro Glu Ile Ala Gln Gln Asp
115 120 125

Ile Val Leu Pro Asp Met Ala Val Gly Ile Tyr Asp Trp Ala Leu Val
130 135 140

Val Asp His Gln Arg Gln Thr Val Ser Leu Leu Ser His Asn Asp Val
145 150 155 160

```
Asn Ala Arg Arg Ala Trp Leu Glu Ser Gln Gln Phe Ser Pro Gln Glu
                165                 170                 175

Asp Phe Thr Leu Thr Ser Asp Trp Gln Ser Asn Met Thr Arg Glu Gln
            180                 185                 190

Tyr Gly Glu Lys Phe Arg Gln Val Gln Glu Tyr Leu His Ser Gly Asp
        195                 200                 205

Cys Tyr Gln Val Asn Leu Ala Gln Arg Phe His Ala Thr Tyr Ser Gly
    210                 215                 220

Asp Glu Trp Gln Ala Phe Leu Gln Leu Asn Gln Ala Asn Arg Ala Pro
225                 230                 235                 240

Phe Ser Ala Phe Leu Arg Leu Glu Gln Ser Ala Ile Leu Ser Leu Ser
                245                 250                 255

Pro Glu Arg Phe Ile Leu Cys Asp Asn Ser Glu Ile Gln Thr Arg Pro
            260                 265                 270

Ile Lys Gly Thr Leu Pro Arg Leu Pro Asp Pro Gln Glu Asp Ser Lys
        275                 280                 285

Gln Ala Glu Lys Leu Ala Asn Ser Ala Lys Asp Arg Ala Glu Asn Leu
    290                 295                 300

Met Ile Val Asp Leu Met Arg Asn Asp Ile Gly Arg Val Ala Val Ala
305                 310                 315                 320

Gly Ser Val Lys Val Pro Glu Leu Phe Val Val Glu Pro Phe Pro Ala
                325                 330                 335

Val His His Leu Val Ser Thr Ile Thr Ala Gln Leu Pro Glu Gln Leu
            340                 345                 350

His Ala Ser Asp Leu Leu Arg Ala Ala Phe Pro Gly Gly Ser Ile Thr
        355                 360                 365

Gly Ala Pro Lys Val Arg Ala Met Glu Ile Ile Asp Glu Leu Glu Pro
    370                 375                 380

Gln Arg Arg Asn Ala Trp Cys Gly Ser Ile Gly Tyr Leu Ser Phe Cys
385                 390                 395                 400

Gly Asn Met Asp Thr Ser Ile Thr Ile Arg Thr Leu Thr Ala Ile Asn
                405                 410                 415

Gly Gln Ile Tyr Cys Ser Ala Gly Gly Gly Ile Val Ala Asp Ser Gln
            420                 425                 430

Glu Glu Ala Glu Tyr Gln Glu Thr Phe Asp Lys Val Asn Lys Ile Leu
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Arg Gln Leu Glu Lys
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<210> 67
<211> 1263
<212> DNA
<213> Arabidopsis thaliana

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<223> n is a, c, g, or t

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<400> 67
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cgtgaangga ccagaggtta taagcaaaag gtgaaggact atgtacagag tgctctgttt 120

ccagaagcag ggttggatga aggagttggg caagcaggag gagtcggagg acttgttgtt 180

gtcagagacc tcgatcatta ctcatactgt gaatcttgct tgcttccttt tcatgtcaag 240

tgtcacatag gttatgtccc atcgggccag agagtgttag gactgagcaa gttctctaga 300

gtcactgatg ttttcgccaa gcggctccaa gaccctcagc gtttggctga tgatatttgt 360

tcagctctcc aacattgggt caaaccagct ggagccgctg ttgttcttga atgctctcac 420

attcacttcc ccagtttgga cttggactct ctgaacttgt ctagccaccg tggatttgtg 480

aagctactgg tttcctcggg gtcaggagtt ttcgaggatg aaagctcgaa tctttggggt 540

gaatttcaga gtttcttgat gttcaaaggt gtaaaaacgc aagctttgtg cagaaatggc 600

agctctgtga aagagtggtg cccaagcgtt aaaagctcgt ctaaattatc acctgaagtt 660

gacccggaaa tggtttctgc tgttgtttcc atcctgaaat cactgggaga agatccgttg 720

aggaaagaac tcattgctac accaactcga ttcctcaaat ggatgttgaa cttccaaaga 780

accaacctcg aaatgaagct aaacagcttt aaccctgcca aagtcaatgg cgaggtcaaa 840

gagaaaaggc tgcactgtga gctgaacatg cccttctggt caatgtgtga acatcatttg 900

cttccttttct atggagttgt tcatattggc tacttttgtg ctgaaggatc caaccccaac 960

cctgttggaa gttcactcat gaaagcgatt gtacactttt atgggttcaa gcttcaagtg 1020

caagagagga tgnctcgaca gatcgctnaa acgctatcgc ntcttgttgg cggggatgtg 1080

attgttgtgg cggaagctgg gcatacttgt atgatctcta gaggaattga gaagtttgga 1140

agcagcaccg cgacaatcgc agttttgggt cggttttcga gtgacaattc cgcaagagcg 1200

atgtttctag acaagatcca tacaactaat gccttgaaga cagagtcaag ctctccattt 1260

tga 1263

<210> 68
<211> 420
<212> PRT
<213> Arabidopsis thaliana

<220>
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<220>
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<223> Xaa can be any naturally occurring amino acid

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<223> Xaa can be any naturally occurring amino acid

<400> 68

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Pro Arg Pro Xaa Arg Glu Xaa Thr Arg Gly Tyr Lys Gln Lys Val Lys
20 25 30

Asp Tyr Val Gln Ser Ala Leu Phe Pro Glu Ala Gly Leu Asp Glu Gly
35 40 45

Val Gly Gln Ala Gly Gly Val Gly Gly Leu Val Val Val Arg Asp Leu
50 55 60

Asp His Tyr Ser Tyr Cys Glu Ser Cys Leu Leu Pro Phe His Val Lys

65 70 75 80

Cys His Ile Gly Tyr Val Pro Ser Gly Gln Arg Val Leu Gly Leu Ser
85 90 95

Lys Phe Ser Arg Val Thr Asp Val Phe Ala Lys Arg Leu Gln Asp Pro
100 105 110

Gln Arg Leu Ala Asp Asp Ile Cys Ser Ala Leu Gln His Trp Val Lys
115 120 125

Pro Ala Gly Ala Ala Val Val Leu Glu Cys Ser His Ile His Phe Pro
130 135 140

Ser Leu Asp Leu Asp Ser Leu Asn Leu Ser Ser His Arg Gly Phe Val
145 150 155 160

Lys Leu Leu Val Ser Ser Gly Ser Gly Val Phe Glu Asp Glu Ser Ser
165 170 175

Asn Leu Trp Gly Glu Phe Gln Ser Phe Leu Met Phe Lys Gly Val Lys
180 185 190

Thr Gln Ala Leu Cys Arg Asn Gly Ser Ser Val Lys Glu Trp Cys Pro
195 200 205

Ser Val Lys Ser Ser Ser Lys Leu Ser Pro Glu Val Asp Pro Glu Met
210 215 220

Val Ser Ala Val Val Ser Ile Leu Lys Ser Leu Gly Glu Asp Pro Leu
225 230 235 240

Arg Lys Glu Leu Ile Ala Thr Pro Thr Arg Phe Leu Lys Trp Met Leu
245 250 255

Asn Phe Gln Arg Thr Asn Leu Glu Met Lys Leu Asn Ser Phe Asn Pro
260 265 270

Ala Lys Val Asn Gly Glu Val Lys Glu Lys Arg Leu His Cys Glu Leu
275 280 285

Asn Met Pro Phe Trp Ser Met Cys Glu His His Leu Leu Pro Phe Tyr
290 295 300

Gly Val Val His Ile Gly Tyr Phe Cys Ala Glu Gly Ser Asn Pro Asn
305 310 315 320

Pro Val Gly Ser Ser Leu Met Lys Ala Ile Val His Phe Tyr Gly Phe
325 330 335

Lys Leu Gln Val Gln Glu Arg Met Xaa Arg Gln Ile Ala Xaa Thr Leu
340 345 350

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Ser Xaa Leu Val Gly Gly Asp Val Ile Val Val Ala Glu Ala Gly His
        355                 360                 365

Thr Cys Met Ile Ser Arg Gly Ile Glu Lys Phe Gly Ser Ser Thr Ala
    370                 375                 380

Thr Ile Ala Val Leu Gly Arg Phe Ser Ser Asp Asn Ser Ala Arg Ala
385                 390                 395                 400

Met Phe Leu Asp Lys Ile His Thr Thr Asn Ala Leu Lys Thr Glu Ser
                405                 410                 415

Ser Ser Pro Phe
            420
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<210> 69
<211> 1104
<212> DNA
<213> Oryza sativa

<400> 69

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gtcttcgcca agaggttgca gaatcctcaa agactggcta gtgaagtttg tggtgcattg    180

catgctagca tacaacctgc tggtgtggct gttgctctgc aatgttggca catacctttg    240

ccagaaaact tgaaatgcaa gactttgcaa ggttggatta gcacttcaca ttcatctcgc    300

tctggagttt ttgagggtga gagcagctct ttttggaatg acttctcagc ccttcttaag    360

cttaggggca tagacatgga gagggacagc cattctgcct ccatagcttg gtgcccttta    420

aggtctcatg atgtcccagt ctgcaatggg cactgcaaga aggctacaac caacggtgca    480

atttcaccca aatcagtacc agctccctct aatatggttt ctgctgttag ctcaatgctc    540

ttatcccttg gagaggatcc cttcaggaaa gaacttgtag gtactcctca gcgttacgtg    600

caatggctga tgaagttcag agcatgtaac ctagatgtga agctgaatgg ctttacactc    660

aataatttga gtgtatacca gagtccagct ggagatgctg ctgaccatcg agcaatccat    720

tctgagctgc atttgccatt ttgtgcgcag tgcgagcacc atcttctgcc gttctatgga    780

gtagtgcata ttggctacct tgacggcgga gatggtgaag tgattgatcg atctcatttt    840

caggccttgg ttcattttta tggatgcaag cttcaggttc aagagagaat gacaaggcag    900

atagctgaag cagtttattc tgtttcgcat tgtggggcca tagttgttgt agaagctaac    960

cacatttgca tgatatcaag gggaatagag aaaatcagga gtagcactgc aacgattgca   1020

gttctgggtc agtttttgac ggacccttct gccaaggcac gctttctgca gaacgtagta   1080

gatacaactg gtttggcagt atga                                          1104
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<210> 70
<211> 367
<212> PRT
<213> Oryza sativa

<400> 70

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Gln Phe His Val Gly Tyr Val Pro Ser Gly Gly Arg Val Val Gly Leu
            20                  25                  30

Ser Lys Leu Ser Arg Val Ala Asp Val Phe Ala Lys Arg Leu Gln Asn
        35                  40                  45

Pro Gln Arg Leu Ala Ser Glu Val Cys Gly Ala Leu His Ala Ser Ile
    50                  55                  60

Gln Pro Ala Gly Val Ala Val Ala Leu Gln Cys Trp His Ile Pro Leu
65                  70                  75                  80

Pro Glu Asn Leu Lys Cys Lys Thr Leu Gln Gly Trp Ile Ser Thr Ser
                85                  90                  95

His Ser Ser Arg Ser Gly Val Phe Glu Gly Glu Ser Ser Ser Phe Trp
            100                 105                 110

Asn Asp Phe Ser Ala Leu Leu Lys Leu Arg Gly Ile Asp Met Glu Arg
        115                 120                 125

Asp Ser His Ser Ala Ser Ile Ala Trp Cys Pro Leu Arg Ser His Asp
    130                 135                 140

Val Pro Val Cys Asn Gly His Cys Lys Lys Ala Thr Thr Asn Gly Ala
145                 150                 155                 160

Ile Ser Pro Lys Ser Val Pro Ala Pro Ser Asn Met Val Ser Ala Val
                165                 170                 175

Ser Ser Met Leu Leu Ser Leu Gly Glu Asp Pro Phe Arg Lys Glu Leu
            180                 185                 190

Val Gly Thr Pro Gln Arg Tyr Val Gln Trp Leu Met Lys Phe Arg Ala
        195                 200                 205

Cys Asn Leu Asp Val Lys Leu Asn Gly Phe Thr Leu Asn Asn Leu Ser
    210                 215                 220

Val Tyr Gln Ser Pro Ala Gly Asp Ala Ala Asp His Arg Ala Ile His
225                 230                 235                 240

Ser Glu Leu His Leu Pro Phe Cys Ala Gln Cys Glu His His Leu Leu
                245                 250                 255

Pro Phe Tyr Gly Val Val His Ile Gly Tyr Leu Asp Gly Gly Asp Gly
            260                 265                 270

Glu Val Ile Asp Arg Ser His Phe Gln Ala Leu Val His Phe Tyr Gly
        275                 280                 285
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Cys Lys Leu Gln Val Gln Glu Arg Met Thr Arg Gln Ile Ala Glu Ala
    290                 295                 300

Val Tyr Ser Val Ser His Cys Gly Ala Ile Val Val Val Glu Ala Asn
305                 310                 315                 320

His Ile Cys Met Ile Ser Arg Gly Ile Glu Lys Ile Arg Ser Ser Thr
                325                 330                 335

Ala Thr Ile Ala Val Leu Gly Gln Phe Leu Thr Asp Pro Ser Ala Lys
            340                 345                 350

Ala Arg Phe Leu Gln Asn Val Val Asp Thr Thr Gly Leu Ala Val
        355                 360                 365
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<210> 71
<211> 1479
<212> DNA
<213> Zea mays

<400> 71

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ttattttctc tatccccctt gagatcatgc aaatgtggtt ggcctcaaca acgaccatgg    180

ccccattgtg cgaaactgaa taaaccgctt cagctatctg ccttgtcatc ctttcttgaa    240

cctgaagctt gcacccgtag aaatgaacca acgcctgaaa atgcgaccga tcaatgcctt    300

ctccgcttcc attgccaaag tacccaatgt gaactactcc gtagaagggc agaagatggt    360

gttcacattg agcacaaaat ggcaagtgca gctccgatct gattgctcca tgatcagttg    420

tgcctccacc tgtcctctca tataagctaa cattactaag tgtaaaacca ttcagcttca    480

cgtctagtag attacatgct ttgaacttca tcagccactg cacataacgc tgaggagtgc    540

ctaaaagctc tttcctgagg gggtcctctc cgagtgataa gagcatcgag gtaacagcag    600

aaaccatgcc attagttgag tttttcttgc agagcccgtt agagagtgga acctcatgag    660

accttaaagg gcaccaagga atagaaacag tacggtcctt agcctccacg tctatgcccc    720

taagcttaac aagagccaag aagtcactcc agaaagtgct gctttcacct tcaaagactc    780

cagagcgaga tgaatgtgaa gttctaatcc aaccttccaa agtcttgcat tccaagtttt    840

ctggtaaagg aatgtgccag cactgcagag caacagccac accagcaggt tgaatgctag    900

catgcagtgc accacagatt tcattagcta gtctttgagg gttttgcaat ctcttggcaa    960

agacatcaga tactctagaa agcttgctta acccaaccac tcttccacct gagggaacat   1020

acccgacatg gcactgtatg ctgaatggaa gcaagcatga ctcacaatag gagaaaagtt   1080

caatgtctcg aacaactact tgcccgccag ttccaccagc agatccagtc cttttatcca   1140

caccaacctc tggaaacaga gcaccttgca ctatgtcttt tacttttgc ctgtagcctg   1200

tagatttaga tatatgttaa atacagatca tgaagcaatt aaaacaaaag tagagatgat   1260

gaataagacc ccacatatct tcattaaaac aaaaggttat gcaaaaaaaa acatcctcac   1320
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atatcacata tgtcactctt ccttgtataa acagttctgt ctctttgaat aagaacacca 1380

tgacaacctc tactacacat gacttgcatg ggaatagatt atccagattt cacatgactt 1440

ctttataata gaacaagaat gatgtggctc cgtgtcaga 1479

<210> 72
<211> 668
<212> DNA
<213> Bos taurus

<400> 72
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gccaagcacc acaaggcaga accaggccca gaggactctc ttcatgagca gtgcagccct 120

tggaggaaga atgcctgctg ctctgtcaac accagcatag aagcccataa ggacatttct 180

tacctttaca gattcaactg ggaccactgc ggcaagatgg agcctgcttg caagaggcac 240

tttattcagg acacctgtct ctacgagtgc tcacctaatc ttggcccttg gatcagggag 300

gttaaccaga ggtggaggaa agagagggtg cttggtgtgc ctctttgcaa agaggactgt 360

cagagctggt gggaagactg caggacctct tacacctgca agagcaactg gcacaagggc 420

tggaactgga cctcaggcta caaccagtgc ccagtgaaag ctgcctgcca caggtttgac 480

ttctacttcc caactcctgc tgctctttgc aatgaaatct ggtctcactc ttacaaggtc 540

agcaattaca gcaggggcag cggcaggtgc attcagatgt ggttcgaccc tttccagggc 600

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cagggcat 668

<210> 73
<211> 223
<212> PRT
<213> Bos taurus

<400> 73

Met Ala Gln Ala Pro Arg Thr Pro Arg Ala Arg Thr Asp Leu Leu Asn
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Val Cys Met Asp Ala Lys His His Lys Ala Glu Pro Gly Pro Glu Asp
20 25 30

Ser Leu His Glu Gln Cys Ser Pro Trp Arg Lys Asn Ala Cys Cys Ser
35 40 45

Val Asn Thr Ser Ile Glu Ala His Lys Asp Ile Ser Tyr Leu Tyr Arg
50 55 60

Phe Asn Trp Asp His Cys Gly Lys Met Glu Pro Ala Cys Lys Arg His
65 70 75 80

Phe Ile Gln Asp Thr Cys Leu Tyr Glu Cys Ser Pro Asn Leu Gly Pro
85 90 95

Trp Ile Arg Glu Val Asn Gln Arg Trp Arg Lys Glu Arg Val Leu Gly

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            100                 105                 110

Val Pro Leu Cys Lys Glu Asp Cys Gln Ser Trp Trp Glu Asp Cys Arg
        115                 120                 125

Thr Ser Tyr Thr Cys Lys Ser Asn Trp His Lys Gly Trp Asn Trp Thr
    130                 135                 140

Ser Gly Tyr Asn Gln Cys Pro Val Lys Ala Ala His Cys Arg Phe Asp
145                 150                 155                 160

Phe Tyr Phe Pro Thr Pro Ala Ala Leu Cys Asn Glu Ile Trp Ser His
                165                 170                 175

Ser Tyr Lys Val Ser Asn Tyr Ser Arg Gly Ser Gly Arg Cys Ile Gln
            180                 185                 190

Met Trp Phe Asp Pro Phe Gln Gly Asn Pro Asn Glu Glu Val Ala Arg
        195                 200                 205

Phe Tyr Ala Glu Asn Pro Thr Ser Gly Ser Thr Pro Gln Gly Ile
    210                 215                 220
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